The Portsmouth Herald

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FOR PORTSMOUTH AND PORTSMOUTH'S INTERESTS
A PAPER FOR THE PEOPLE

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The American Press

Half-Century Club

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New York

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Portsmouth, N. H., Tuesday, January 25, 1938.

LACK OF CONFIDENCE

The real cause of the present business recession is lack of confidence in the future, states George H. Davis, president of the U. S. Chamber of Commerce. He attributes this lack of confidence to the passage of laws culminating in the undistributed profits tax and the threat of the wages-and-hours bill. Mr. Davis calls for assurances that no additional laws regulating business will be passed at this session of Congress.

Gleanings from the Past

From The Herald's Diary

TEN YEARS AGO—JAN. 25, 1928

Rev. Allen Brown, pastor of the Universalist church, dies suddenly.

Democrats planning to organize a Smith-for-President club.

High winds cause considerable damage in this section.

TWENTY-FIVE YEARS AGO—JAN. 25, 1913

Mr. and Mrs. Fred F. Parsons celebrate their 27th anniversary of their marriage.

Man arrested in this city for Lawrence, Mass., police, charged with horse stealing.

FIFTY YEARS AGO—JAN. 25, 1888

The Portsmouth Machine Co's. machine shop and plant, foundry and other property sold at auction to Charles H. Mendum for $114,200.

Fifteen below zero this morning.

The pay of local police officers is $2 a day.

Big blizzard starts.

E. C. Moody of York hauls into city a very handsome stick of timber intended for a mast for the schooner Hattie Lewis.

"The Streets of New York" presented at the Franklin theatre by George A. Hill's original People's Theatre Co.

SEVENTY-FIVE YEARS AGO—JAN. 25, 1863

At the navy yard there are about 1600 men at work and disbursements are about $60,000 monthly. The ships in port are Sasacus, steam corvette, completing; Patuxet, steam sloop-of-war, ribs up; Nipsic, screw corvette, keel laid; Agamenticus, iron clad, finishing.

News of the Navy and Navy Yards

Formerly on Duty Here

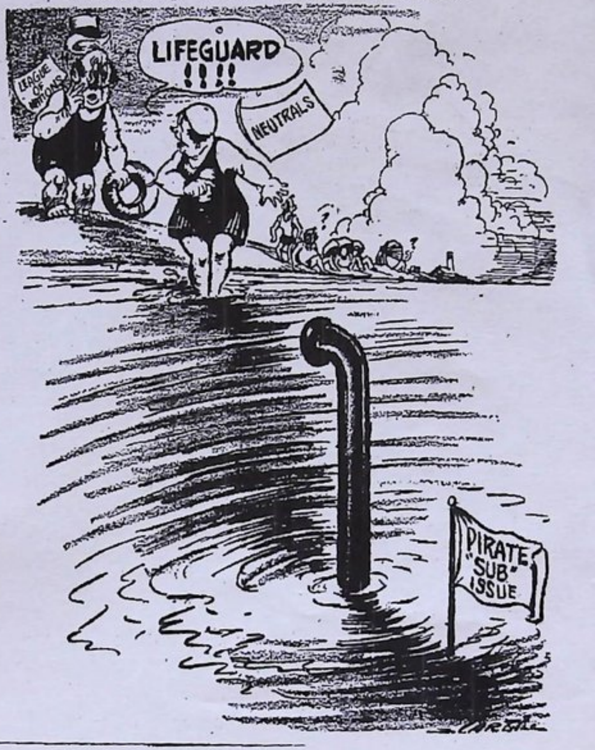
Lieut. Comdrs. Stanley C. Norton and Watson O. Bailey, who were formerly stationed in the local yard (industrial department) are among the list of officers named for promotion by the line selection board for the rank of commander.

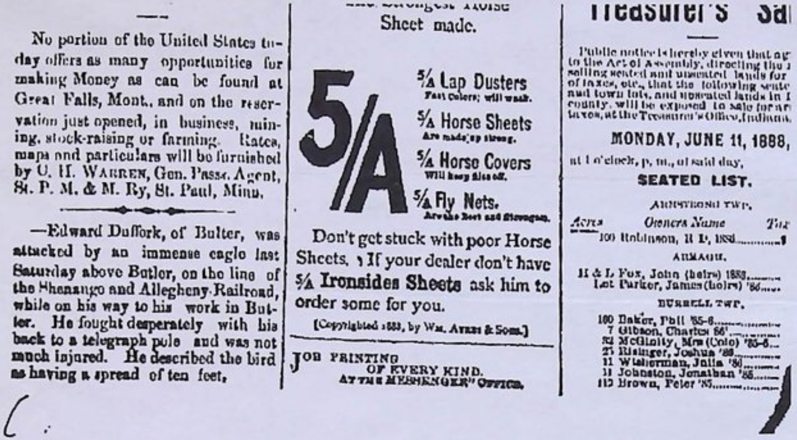
Two New Hampshire men were also named by the board, Otton B. Benne-

POLICE GET JOB FOR ROCHESTER HITCH HIKER

Boston, Jan. 25—Tired and hungry, after hitch-hiking from New Hampshire in search of work, Herman H. Hildreth, 24, of 245 North Main street, Rochester, N. H., last night appealed to Cambridge police to lock him up as a tramp. Lieut. Robert J. Douglas.

THERE'S THAT PESKY SEA SERPENT AGAIN!





No portion of the United States to-day offers as many opportunities for making Money as can be found at Great Falls, Mont., and on the reservation just opened, in business, mining, stock-raising or farming. Rates, maps and particulars will be furnished by C. H. WARREN, Gen. Pass. Agent, St. P. M. & M. Ry, St. Paul, Minn.

* * *

—Edward Duffork, of Bulter, was attacked by an immense eagle last Saturday above Butler, on the line of the Shenango and Allegheny Railroad, while on his way to his work in Butler. He fought desperately with his back to a telegraph pole and was not much injured. He described the bird as having a spread of ten feet.

The Strongest Horse
Sheet made.

5/A

5/A Lap Dusters
Fast Colors; will wash.

5/A Horse Sheets
Are made up strong.

5/A Horse Covers
Will keep flies off.

5/A Fly Nets.
Are the Best and Strongest.

Don't get stuck with poor Horse Sheets. If your dealer don't have 5/A **Ironsides Sheets** ask him to order some for you.

[Copyrighted 1888, by Wm. Ayres & Sons.]

JOB PRINTING
OF EVERY KIND.
AT THE MESSENGER" OFFICE.

Treasurer's Sa

Public notice is hereby given that ag
to the Act of Assembly, directing the
selling seated and unseated lands for
of taxes, etc., that the following seate
and town lots, and unseated lands in I
county, will be exposed to sale for ar
taxes, at the Treasurer's Office, Indiana,

MONDAY, JUNE 11, 1888,

at 1 o'clock, p. m., of said day,

SEATED LIST.

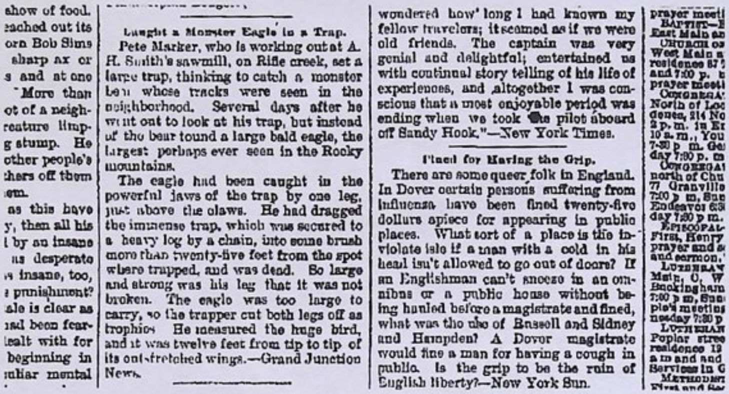
ARMSTRONG TWP.

Acres	*Owners Name*	*Tax*
100	Robinson, R P, 1886	$
	ARMAGH.	
H & L	Fox, John (heirs) 1886	
Lot	Parker, James (heirs) '86	
	BURRELL TWP.	
100	Baker, Phil '85-6	
7	Gibson, Charles 86'	
82	McGinity, Mrs (Cole) '85-6	
25	Rislinger, Joshua '86	
11	Wisherman, Julia '86	
11	Johnston, Jonathan '85	
113	Brown, Peter '85	

Indiana Weekly Messenger

Indiana, Penn

5. 16. 1888



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Caught a Monster Eagle in a Trap.

Pete Marker, who is working out at A. H. Smith's sawmill, on Rifle creek, set a large trap, thinking to catch a monster bear whose tracks were seen in the neighborhood. Several days after he went out to look at his trap, but instead of the bear found a large bald eagle, the largest perhaps ever seen in the Rocky mountains.

The eagle had been caught in the powerful jaws of the trap by one leg, just above the claws. He had dragged the immense trap, which was secured to a heavy log by a chain, into some brush more than twenty-five feet from the spot where trapped, and was dead. So large and strong was his leg that it was not broken. The eagle was too large to carry, so the trapper cut both legs off as trophies. He measured the huge bird, and it was twelve feet from tip to tip of its outstretched wings.—Grand Junction News.

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wondered how long I had known my fellow travelers; it seemed as if we were old friends. The captain was very genial and delightful; entertained us with continual story telling of his life of experiences, and altogether I was conscious that a most enjoyable period was ending when we took the pilot aboard off Sandy Hook."—New York Times.

Fined for Having the Grip.

There are some queer folk in England. In Dover certain persons suffering from influenza have been fined twenty-five dollars apiece for appearing in public places. What sort of a place is the inviolate isle if a man with a cold in his head isn't allowed to go out of doors? If an Englishman can't sneeze in an omnibus or a public house without being hauled before a magistrate and fined, what was the use of Russell and Sidney and Hampden? A Dover magistrate would fine a man for having a cough in public. Is the grip to be the ruin of English liberty?—New York Sun.

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New ark Daily Advocate

Newark, ohio
1-23- 1892

Pygmoid Australomelanesian *Homo sapiens* skeletal remains from Liang Bua, Flores: Population affinities and pathological abnormalities

T. Jacob[*], E. Indriati[*], R. P. Soejono[†], K. Hsū[‡§], D. W. Frayer[¶], R. B. Eckhardt[§||], A. J. Kuperavage[||], A. Thorne[**], and M. Henneberg[††]

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Contributed by K. Hsü, July 7, 2006

Liang Bua 1 (LB1) exhibits marked craniofacial and postcranial asymmetries and other indicators of abnormal growth and development. Anomalies aside, 140 cranial features place LB1 within modern human ranges of variation, resembling Australomelanesian populations. Mandibular and dental features of LB1 and LB6/1 either show no substantial deviation from modern *Homo sapiens* or share features (receding chins and rotated premolars) with Rampasasa pygmies now living near Liang Bua Cave. We propose that LB1 is drawn from an earlier pygmy *H. sapiens* population but individually shows signs of a developmental abnormality, including microcephaly. Additional mandibular and postcranial remains from the site share small body size but not microcephaly.

Indonesia | microcephaly | skeletal pathology | asymmetry | dentition

In 2004, skeletal material from the Indonesian island of Flores was described (1) as the holotype of a new hominin taxon, *Homo floresiensis*. It comprised one fairly complete adult skeleton, Liang Bua 1 (LB1), plus an isolated lower left third premolar (P_3) (LB2). Estimated from LB1 were notably low values for stature (1.06 m) and endocranial volume (380 ml), the latter trait all the more remarkable for its association with advanced microblade tools (2). This single individual's traits came to characterize broadly a new species. Other skeletal and dental traits reported as unusual were used to define a taxon that "... combines a mosaic of primitive, unique and derived features not recorded for any other hominin" (1). Additional skeletal remains described 1 year later (3) included not a single fragment of braincase, but it was incorrectly maintained that there are multiple individuals sharing LB1's traits (3). The second mandible (LB6/1) shows no traits that are unknown among modern Australomelanesians, and only some limb bones resembled LB1. There is no support for exceedingly small brain size, the focal characteristic of the postulated new species.

H. floresiensis is maintained to be distinct from the two human taxa recognized in the surrounding region, *Homo erectus* and *Homo sapiens*, interpreted by some as temporal subdivisions of one widely dispersed evolutionary species (4–6). *H. erectus* previously was held to have reached the island ≈840,000 years ago (840 ka), on the basis of Middle Pleistocene stone tools found on Flores (7, 8), remaining totally isolated while giving rise to *H. floresiensis*. Genetic isolation from other hominin populations is a necessary postulate, because prolonged isolation is needed to attain the requisite level of taxonomic distinctiveness (9).

This scenario was disseminated widely and endorsed (10) without critical examination of contradictions inherent in the data. It raises a number of questions. If brain sizes smaller than average for chimpanzees were normal for the new species, how were these hominins able to manufacture stone microblades postulated to have been hafted as compound tools (2), previously known to have been crafted only by humans with brain sizes three times larger? How could such tools, convergent in detail with those made by *H. sapiens* elsewhere but similar only in broad commonalities to earlier tools on Flores (11), not raise the question of contact between populations? How likely was it that Flores was reached by hominins only once during >800 ka?

Most importantly, premature elaboration of speculative evolutionary scenarios diverted attention from detailed study of the morphological characteristics of the specimens themselves. All but lost was any realization that the species diagnosis that had attracted so much attention centered on a single, distinctly odd, individual. Although LB1 exhibits a very small skull and numerous anomalies, other skeletons that also exhibited serious abnormalities (12) were not used to establish new species, a point implicit in our initial publication on LB1 (13), which cited 10 examples of microcephalic skeletons from the Upper Pleistocene and Holocene (14, 15, [‡‡]). Other Liang Bua Cave bones described later merely (3) confirm general body size and unremarkable anatomical similarities.

The notion of a new, long-enduring species of humans raises problems concerning the supposed isolation of a taxon of large mammals. Assuming Flores was colonized by a founding cohort of a few *H. erectus* individuals who reached the island by crossing a water barrier only once, descendants would have comprised a highly inbred isolate, with the adaptive constraints implied by that consequently narrow gene pool. Confounding this problem is the question of whether the land area of a single island, Flores, was sufficient to support a hunter–gatherer population for some 40,000 generations. Furthermore, if this population had been isolated genetically up until the very recent past, how can identical anatomical features shared by members of the putative new taxon and subsequent *H. sapiens* be explained? Alternatively, if contact and interbreeding did occur, how could separate species status for *H. floresiensis* be justified?

Because of these questions raised by published descriptions of the holotype specimen, the initial diagnosis was challenged with an alternative hypothesis that LB1 exhibited abnormal morphological signs indicative of microcephaly (13, 17). These signs occurred in an individual sampled from a *H. sapiens* group that was small in

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Conflict of interest statement: No conflicts declared.

Freely available online through the PNAS open access option.

Abbreviations: Liang Bua 1, LB1; ka, thousand years ago; P_3, lower third premolar; P_4, lower fourth premolar.

[§]To whom correspondence may be addressed. E-mail: eyl@psu.edu or kenjhsu@aol.com.

[‡‡]Dokladal, M. & Horackova, L. (1994) *Homo* 45, Suppl., S40 (abstr.).

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Proc Natl Acad Sc.

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also how it is that refuse or dirt is so seldom met with as is the case in other great capitals.—[New York Tribune.

A Monster Eagle.

Buford Hall, Jr., the 12-year-old son of Mr. Buford Hall, killed an eagle last week on his father's farm. The bird was in a tree some distance away, when the little boy, who is an excellent shot, fired a charge of shot at it from a breech-loader, shooting is in the head. The bird measured six feet six inches from tip to tip. It was attracted to the place by the young lambs. The young hunter is very proud of his trophy, and brought it to town on Friday to have it stuffed and mounted.—[Georgetown (Ky.) Times.

Best Part of a Hide.

that it was dead. At length she held it to her bosom with one hand, and tried to run on three, lest the black dog might return. When she got to a safe tree she clambered up as best she could, hugging her precious charge with one arm, and there she gave way to her grief, and cried piteously, while a kite sailed grimly round the tree, as if claiming his own. I have often wondered what she did in the end with the little lifeless body; I cannot believe she left it to the kite. It would not surprise me to know that she buried it, or laid it in some hollow and covered it with leaves and stones."

The Wedding-Ring Finger.

There are facts connected with the ring finger, remarks an observant moralist, which render it in a peculiar

handers. They are more successful than any pitchers that go in the box.

Lowe, Duffy and McCarthy, of the Bostons, are the greatest outfielders in the country. They form a trio that cannot be beaten.

THERE were never so many errorless games played in any season in the same time. The game has surely got to be a science.

ONE thing is certain. So many games with such close scores never characterized the League season so early before. Is it possible that the ball is too dead?

THERE is no pitcher in the country to compare with Killroy, of Washington, in keeping close vigil on base runners, except possibly Galvin of Pittsburg.

THOMAS BURNS, the last of the old Chicago White Stockings except Anson, has accepted the offer to manage the Pittsburg team. He will get a salary of $4000.

IT has been computed by the process of permutations and combinations that there are 478,001,000 distinct ways in which the National League of twelve baseball clubs can finish the season.

THE report that Pitcher Clarkson is to be released by the Boston club is authoritatively denied, but it is understood that he is to chiefly figure on the bench and at the turnstile during the remainder of the season.

No 1 Extra live geese ℔	
Mixed	
MISCELLANEOUS.	
TALLOW—Country, ℔...	
City........................	
SEEDS—West Med'm clo'er	7
Mammoth Clover.........	7
Timothy prime...........	1
Timothy choice...........	1
Blue grass.................	2
Orchard grass.............	1
Millet.......................	1
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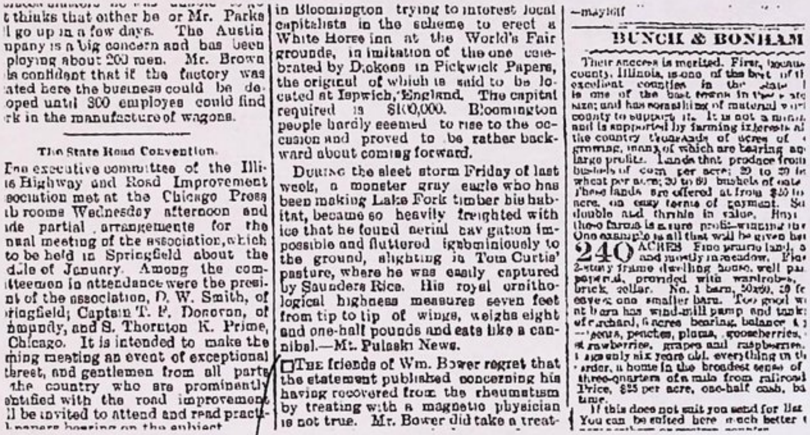
BUTTER—Creamery Extra.	
EGGS—Pa., Firsts..........	
NEW YORK	
FLOUR—Patents...........	

Indiana Progress
Indiana, Penn.
6-1-1892



[illegible] t thinks that either he or Mr. Parks ll go up in a few days. The Austin npany is a big concern and has been ploying about 200 men. Mr. Brown is confident that if the factory was ated here the business could be de- oped until 300 employes could find rk in the manufacture of wagons.

The State Road Convention.

The executive committee of the Illi- is Highway and Road Improvement sociation met at the Chicago Press ib rooms Wednesday afternoon and ide partial arrangements for the nual meeting of the association, which to be held in Springfield about the dle of January. Among the com- itteemen in attendance were the presi- nt of the association, D. W. Smith, of ringfield; Captain T. P. Donovan, of ompndy, and S. Thornton K. Prime, Chicago. It is intended to make the ming meeting an event of exceptional terest, and gentlemen from all parts the country who are prominently entified with the road improvement ll be invited to attend and read practi- l papers bearing on the subject.

in Bloomington trying to interest local capitalists in the scheme to erect a White Horse inn at the World's Fair grounds, in imitation of the one celebrated by Dickens in Pickwick Papers, the original of which is said to be located at Ipswich, England. The capital required is $100,000. Bloomington people hardly seemed to rise to the occasion and proved to be rather backward about coming forward.

During the sleet storm Friday of last week, a monster gray eagle who has been making Lake Fork timber his habitat, became so heavily freighted with ice that he found aerial navigation impossible and fluttered ignominiously to the ground, alighting in Tom Curtis' pasture, where he was easily captured by Saunders Rice. His royal ornithological highness measures seven feet from tip to tip of wings, weighs eight and one-half pounds and eats like a cannibal.—Mt. Pulaski News.

☐The friends of Wm. Bower regret that the statement published concerning his having recovered from the rheumatism by treating with a magnetic physician is not true. Mr. Bower did take a treat-

—may16tf

BUNCH & BONHAM

Their success is merited. First, [illegible] county, Illinois, is one of the best of th excellent counties in the state. I is one of the best towns in the state size; and has something of natural w county to support it. It is not a mini and is supported by farming interests al the country thousands of acres of growing, many of which are bearing ag large profits. Lands that produce from bushels of corn per acre; 20 to 30 in wheat per acre; 30 to 60 bushels of oats These lands are offered at from $30 to acre, on easy terms of payment. Su double and thrible in value. Hav these farms is a sure profit-winning inv One example is all that will be given her

240 ACRES Fine prairie land, a and mostly in meadow. Fine 2-story frame dwelling house, well pa papered, provided with wardrobes, brick cellar. No. 1 barn, 50x60, 20 fe eaves; one smaller barn. Two good w at barn has wind-mill pump and tank; of orchard, 6 acres bearing, balance — pears, peaches, plums, gooseberries, strawberries, grapes and raspberries. I are only six years old. everything in th order, a home in the broadest sense of three-quarters of a mile from railroad Price, $25 per acre, one-half cash, ba time.

If this does not suit you send for list You can be suited here much better

Weekly Herald Dispatch

Decatur, Illinois

12.10.1892

number by the disease, states
l the trees by the use of scraps
ed in the soil around them,
eing that the trees were defi-
. After practicing the iron
e states that the trees grow
and bore fruit for years.

A Large Eagle Killed.

Recently while hunting on the Catoctin Mountain, near the Adamstown road, Mr. Martin L. Shaff, of near Jefferson, shot a large eagle, a cross of the black and grey, which measured six feet from tip to tip of wings and three feet from head to tail, and weighed nine pounds. The claws of the bird, when expanded, were six inches in diameter. There was a flock of eleven of these birds flying high in the air when Mr. Shaff made the shot which broke the wing of one of them and brought it down.

Madison, Ind., one of t
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session at Washington,
Presbyterian Church
Beale and Dr. Barnard
same section of Pennsy
cated in the same sch
was pastor at Bellefon
was married to one of
Miss Mary Moore, and
the officiating clergyma

Mr. Irving Albaugh
in the Reformed chapel
ing at the usual hour.

The Rev. D. S. Fouse,
delivered the sermon

Frederick News
Maryland
5-20-1893

may well be proud.

An unusually large number of eagles are seen throughout the Catskill and Shawangunk mountain ranges this fall. Hunters and others have already met with several adventures with these monster birds.

Mary Van Buskirk of Gulf Summit recently saw a large eagle swooping down upon a hen. She tried to frighten the bird away, but it attacked her and sunk its talons into her arms. She seized a hatchet with which she succeeded in killing the eagle.

A boy named Frank Lomister had a desperate fight with a monster eagle about six miles from Woodburne a few days ago, and he was likely to be overpowered when help arrived and one of the birds was killed.

POPULAR YOUNG FOLK MARRY.

Sunday News Herald
Syracuse, NY
11.19.1893

THE SUNDAY HERALD: SYRACUSE, SUNDAY MORNING, NOVEMBER 19

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crushed or curled or other-
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highest offer at the time the winner breasted the tape. The rent of the meadow was then expended in "white bread" loaves, which were distributed among the poor of the town.—[Yorkshire Herald.

A Monster Eagle.

Mr. J. R. Davis, of Colquitt, presented us a few days ago with the talon of an immense eagle which he recently killed with his unerring Winchester. The huge bird measured six feet nine inches from tip to tip of wings and seven and one-half inches from rear to front toes. With ease this winged monster could have carried away a small child or lamb.—[Blakely (Ga.) News.

finally went to Washington, and armed with the recommendations of the Naval Academy, urged his claim upon the Surgeon General.

"Do you see the Washington Monument out that window?" asked the official.

"Yes, sir," promptly replied the sailor.

To test his eyesight as well as his honesty, another question was propounded.

"See that sparrow on the top of the monument?"

Without hesitation, the sailor replied, "No, sir."

"Neither do I," added the chief examining officer. "Your eyesight seems to be good enough, and I shall at once order your reinstatement in the navy."—[Baltimore Sun.

McKean Democrat
Smethport, Penn
6-1-1894

ature,[§§] as still common on Flores today. Several of the publicaions (18–20) supporting microcephaly subsequent to our own (13) have been contested (21, 22).

From the beginning, the "*H. floresiensis* discovery" was treated as a matter of hominin taxonomy and phylogeny. Curiously, however, comparisons of LB1 were made mostly with *H. sapiens* from other geographic areas of the world, principally Europe. Yet it would have been more appropriate for a supposedly novel human species from the Australomelanesian region to have been compared with other human populations, present as well as past, from that region. Therefore, in contrast to erecting a new species (1, 21, 22), we consider the alternative hypothesis that LB1 was an Australomelanesian *H. sapiens* who manifested microcephaly, which commonly is accompanied by other developmental abnormalities. This hypothesis is testable by comparing the Liang Bua remains with extant Australomelanesian *H. sapiens* populations to assess whether its complex of normal characters conforms to regional patterns, while also documenting cranial and other skeletal features of LB1 that are developmentally abnormal.

Following the initial reports in 2004 (1, 2), the Indonesian chief investigator (R.P.S.) of the original research team asked T.J. to restudy the bones, who in turn invited several of the other authors (E.I., R.B.E., M.H., and A.T.) to join him. We present results of our examination of the original skeletal material, plus previously unreported data from an appropriate living reference population, beginning with an alternate interpretation of Flores' paleogeography.

Evidence Against a New Species

Demography, Continuity, and Isolation. For nearly 4 decades, archeological evidence suggested early human presence on Flores, with stone tools reportedly associated with bones of *Stegodon* estimated to have lived ≈750 ka (23). Additional debated findings extend this date to ≈840 ka (8, 24). If correct, these reports place humans on Flores by the latter half of the Quaternary. To support the hypothesis that *H. floresiensis* evolved in extended isolation there, it is necessary to prove that island was reached once and only once, as contended (2), yet in numbers large enough to embody genetic diversity sufficient to establish a new mammalian species (25) within a relatively short period, then maintain a viable population for some 40,000 human generations in a restricted land area. Such restrictions are not supported by the data for elephant colonization of Flores, because stegodons reached the island at least twice during repeated Pleistocene sea-level oscillations (26). Given this evidence, the premise that humans must have been limited to a single colonization event (2) is unjustifiable.

Global cooling leading to Northern Hemisphere continental glaciation started at the beginning of the Pleistocene, 2 million years ago. Oxygen-isotope studies of deep sea cores indicate more extreme variations, starting with large ice volumes 600–900 ka (27, 28). That time range encompassed lower sea levels, reducing odds against early hominins crossing narrowed seaways beyond Java. Later glaciations also were intense, with >30 glacial and interglacial stages during the last 700 ka. Continental glaciation reached its maximum extent during Isotope Stage 2 of 18 ka, just before the deglaciation leading to the present high-sea-level strand (Isotope Stage 1).

During the glacial stages, water gaps between islands were reduced by lowering global sea-level due to increase of polar ice-volumes documented by isotope studies. At glacial maxima, Bali was contiguous with Java, and a transient unitary land mass connected Sumbawa through Komodo and Rinca to Flores, leaving water gaps of just several kilometers on either side of Lombok (29).

Assuming that the earliest hominins reached Flores during the first intense glacial stage ≈750 ka, there could have been numerous hominin arrivals during later glacial stages with low sea levels, before the final higher sea levels at the beginning of the Holocene (10 ka) again might have constrained contacts. These environmental perturbations replicate on a more limited scale events that occurred elsewhere when various geological phenomena transformed the Mediterranean Sea into a desert and back to a massive body of water (30), with consequent effects on mammalian faunas.

Although today the 14,200-km^2 island of Flores has a population of >3.5 million people, this small land mass, even if entirely suitable for human habitation, would have been capable of supporting far fewer humans at a hunting–gathering subsistence level. Conventional figures of 1 person per 25–2.5 km^2 would yield one-generation total census population sizes (N) of 570 to 5,700 people and much lower effective population (N_e) sizes (31). These figures are below minima estimated (5,816–7,316 adults) for survival of vertebrate populations over 40 generations (32), which is 0.001 of the term posited for human isolation on Flores (2). An alternative approach (33) using home ranges rather than N or N_e (34, 35) yields similar results.

Reduction in size on Flores is unsurprising in an ecosystem characterized by a humid climate, hilly topography, and abundant undergrowth of vegetation. Maintenance of body temperature alone can be a sufficient selective factor for small body size in such surroundings. Selection need only be sufficient to overcome limited levels of gene flow expected on an island separated by stretches of water constituting just filter barriers. Many of the surrounding regions (Peninsular Malaysia, the Andaman Islands, Sumatra, Java, Sulawesi, Papua, and Northern Australia) include populations relatively short in stature (e.g., ref. 36). Diminutive body size does not in itself constitute convincing evidence for either isolation or speciation, because size fluctuations occur repeatedly in mammalian, including human, lineages. In living African pygmies, for example, spatial and genetic isolation manifestly is incomplete (37).

On Flores, there were two separate *Stegodon* invasions, minimal distances from islands occupied by other human populations, a low probability that colonization by an original founder group provided sufficient genetic diversity for adaptation over tens of thousands of generations, and insufficient resources available for sustaining in isolation an adequate effective population size of hunter–gatherers. These are strong arguments against the evolution *in situ* of a new hominin species.

Neurocranium and Face. Considerable damage was done during excavation to the LB1 neurocranium, face, and mandible. Later, when the specimen was disassembled and reconstructed, the skull surface was heavily varnished (1), obscuring some details. However, despite these problems, many anatomical features are clear.

Aside from abnormalities discussed below, not one of the 94 descriptive features of the LB1 cranium or the 46 features observed on both mandibles (see Table 1, which is published as supporting information on the PNAS web site) lie outside the range for modern humans (38–41) from the region. The form of the superciliary area, nasal floor, subnasal region, orbits, and occipital superstructures of LB1 all are encountered routinely among Australomelanesians. Other neurocranial features, excluding small size, asymmetry, and damage (see *Supporting Text*, which is published as supporting information on the PNAS web site), also lie within the range of Australomelanesians. Purportedly (1), the LB1 cranium displays two skeletal features "not seen in modern humans." In one, "a deep fissure separates the mastoid process from the petrous crest of the tympanic" bone. The other is "a recess between the tympanic plate and the entoglenoid pyramid" on the medial part of the mandibular fossa (1). Australian and Tasmanian crania commonly display both of these features (39–41). The latter trait also is present in two Pleistocene Australians, Kow Swamp 5, and, in a reduced form, Keilor (42).

[§§] Eckhardt, R. B., Kuperavage, A., Sommer, H. J., Jr., & Galik, K. (2005) Poster presented at the International Society of Biomechanics XXth Congress/American Society of Biomechanics 29th Annual Meeting, Cleveland, OH, August 2, 2005.

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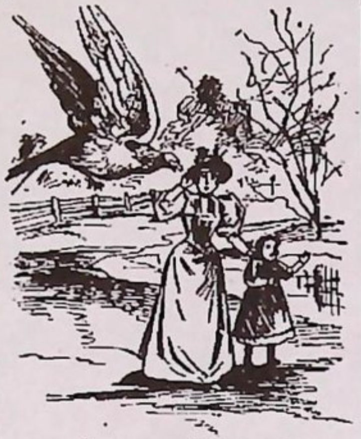
BRAVE YOUNG WOMAN.

How Anna McDowell Killed an Eagle with a Hatpin.

Miss Anna McDowell, 19 years old, and a resident of Quakake valley, near Wilkesbarre, Pa., is at present superintending the work of a local taxidermist who is stuffing one of the largest bald eagles ever seen in that section. The giant bird was killed by the girl while it was endeavoring to carry off a three-year-old child named Nettie Hinkle. The little one was playing along a small trout stream near the main road, running through the valley. Miss McDowell was on her way to visit her aunt, when she heard the child's screams, and, rushing to the rescue, found Nettie in the talons of a large bald eagle, which had boldly attacked her, but did not seem able to carry her away. She pulled Nettie from the bird's talons, but when she attempted to take the wounded child in her arms the bird attacked her fiercely.



DEFENDED HERSELF NOBLY.

Miss McDowell would not retreat and leave the child behind, so, standing over her, she beat off the attacks of the bird as best she could. The eagle was now furious. It whirled about and dashed, beak and talons extended, at the brave girl, who beat it off again and again and again with her arms. The beak and talons wounded Miss McDowell severely, and as she did not have a weapon she was unable to retaliate with effect. With gashes on her arms, head and shoulders, she was rapidly losing strength, when she thought of her hatpin. Grasping this firmly, she made repeated stabs at the bird, which, despite its wounds, persisted in the attack. Finally, as her strength was about gone, she managed to grasp the bird by the neck, and with one fortunate thrust sent the needle through the head of the bird, killing it. Then, overcome by her wounds, she fell unconscious across the body of her terrible antagonist.

Little Nettie, badly wounded though she was, made her way to her home, a short distance away, and told her parents that "a good lady saved me from a bad bird at the creek." While Mrs. Hinkle attended to her child's wounds, Mr. Hinkle hurried along the creek and soon came to the scene of the fight. He carried the still unconscious young woman to his home and sent for a doctor. Miss McDowell soon recovered consciousness and after her wounds were dressed was driven home. She will be able to be about in a couple of weeks.

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in attendance on the jubilee convention of the Missionary society and boards of the Christan church. The sessons will continue until Thursday night. Communion services were celebrated in Music hall, and three large overflow meetings in churches so as to accommodate over 10,000 communicants.

Attacked by an Eagle.

Ashtabula, O., Oct. 16.—An immense eagle attacked Mrs. Arthur Stewart of Saybrook, this county, while she was out in the yard and seriously injured her. The bird killed a dog which came to her assistance. The bird escaped just as Mr. Stewart returned home and found his wife lying helpless on the ground.

Millionaire Schultz Dead.

Zanesville, O., Oct. 16.—Robert D. Schultz, 60, the famous soap manufac-

Cattle—Good to fancy, $5 80@6 95;
mon to medium steers, $4 50@4 75;
and bulls, $2 00@4 65; stockers and fe
$2 50@4 75; Texans, $3 50@4 15. Ca
$4 00@7 00.

Hogs—Fair to prime, $4 27½@4 60;
packers', $3 95@4 25; mixed lots, $4
4 60; butchers', $4 30@4 65; commo
choice lightweights, $4 25@4 60; pigs,
@4 50.

Sheep and Lambs—Poor to choice
$1 50@4 00; feeders, $3 25@3 70; we
rangers, $2 50@3 35; common to c
lambs, $3 25@5 10.

Wheat—No 2 red, 72@73c. Corn—N
32½@32¾c. Oats—No 2, 23@23¼c.

PITTSBURG.

Cattle—Choice, $5 80@6 00; prime, $5
5 75; good, $5 20@5 40; tidy butchers',
@5 00; fair, $4 25@4 60; common, $3
3 75; bulls, stags and cows, $2 00@4
fresh cows, $30 00@50 00. Calves—$7
7 25.

Hogs—Mediums, $4 70; heavy York
$4 65@4 70; light Yorkers, $4 60@4
hevy hogs, $4 60@4 70; pigs, $4 55@4

Sandusky Star
Sandusky, Ohio
10-16-1899

whistle was blown and every effort made to attract the attention of the man, but the train could not be stopped in time to samo his life. Quirk was a student of Pio Nono college at St. Francis and was on his way home when killed.

LARGE EAGLE KILLED.

James Dooley of This City Brings Down a Feathered Monster.

The American eagle which is one of the emblems of our country and many years ago was a common bird throughout the land, has gradually disappeared one by one until now it is a very scarce bird and only now and then is one seen in this section of the north.

Jim. Dooley, a musician of note and a good citizen of our city, while out squirrell hunting near Kellogg's Corners, in Racine county, was skirmishing' the woods in that section, when all of a sudden he heard a loud noise in the tall tree tops, and much to his surprise it proved to be a large American eagle measuring 7 foot 9 inches from tip to tip. He carried a rifle and with a steady aim succeeded in putting a ball through one of the joints in the bird's wings. The bird in trying to fly fell to the ground. Dooley having a revolver with him sunk another shot into the eagle's body, killing it instantly. He brought it home and now Kammerer, the taxidermist, is mounting it.

Information About the Star Course: So many inquiries are being made regarding the Star Course that the following statement seems called for: The prospects are good for the entire house being sold. If any regular two dollar ticket holders are obliged to take chairs, a rebate of twenty-five cents on each ticket will be made. Absolutely no seats will be reserved until the opening of the board next Monday evening, Oct. 23, at seven o'clock, at the association building. No employe of the association is permitted to reserve seats for anyone, and no "members" will be given out or assigned, ticket holders being expected to arrange their own "line." Copies of the elegant prospectus can still be had by applying at the building.

The Hallet & Davis Co. have not neglected the opportunity to make a master stroke for the Hallet & Davis Co. They have offered the committee having in charge the purchase of a home for Ad-

Racine Daily Journal

Wisconsin
10-18-1899

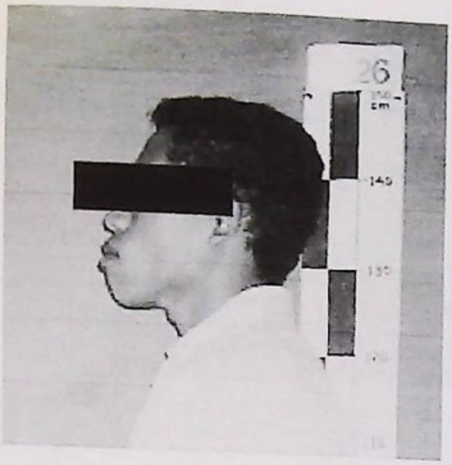
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Fig. 1. Absence of external chin is common in Australomelanesian populations. Here we show Rampasasa individual No. 26, who lacks a chin. Our work on the Rampasasa population determined that 93.4% of the sample have neutral (flat) or negative chins. Absence of a chin cannot be a valid taxonomic character for the Liang Bua mandibles. (Photograph is by E.I.)

Absence of a true chin has been listed as a distinguishing feature (1, 3), but our observations on the Rampasasa population determined that 93.4% of these people have neutral (flat) or negative chins (Fig. 1). It is not valid to contend that chin absence is a taxonomic character in separating the LB hominins from *H. sapiens*. Finally, mandibular size is not a valid criterion. For example, of five partial mandibles from Klasies River Mouth (KRM), three clearly are smaller than LB1 and LB6/1 (43). One KRM mandible is ≈66% of the size of LB6/1, yet virtually all researchers regard the KRM sample as *H. sapiens*. Overall, the Liang Bua sample is characterized by many features that, rather than being unique, are widespread human structural polymorphisms.

An unarguable feature of LB1 is its small brain coupled with a short stature. Compared with our Rampasasa sample, with average cranial capacities of 1,198 ml ($n = 41$) for females, 1,354 ml ($n = 35$) for males, and 1,270 ml for the combined sex sample, LB1's cranial capacity directly measured using seed displacement was 430 ml. This volume is slightly higher than other published estimates, but we removed from the endocranial surface some breccia that had lowered earlier estimates. Comparatively, LB1 falls 5.5 SD below the combined sex Rampasasa mean, whereas our estimate for stature[§§] falls 3.3 SD below Rampasasa average stature of 1.46 m. A similar ratio characterizes some families of microcephalics. For example, Burton (44) found individuals in three successive generations with head circumferences some 6 SD below normal population means and statures 3–5 SD below average in this lineage.

Microcephaly is clinically heterogeneous, with numerous syndromes in which very small brain size is but one sign. Causes of microcephaly range from defects at known genetic loci to numerous chromosomal and environmental disturbances that can affect prenatal or postnatal development. Review of 184 syndromes in which microcephaly is one sign (45) shows body size reduction commonly is another: 57 are identified explicitly as exhibiting short stature. Associated signs include facial asymmetry and dental anomalies, as well as trunk/limb disproportions, overtubulated bones, and signs of paresis in the postcranial skeleton (45). Another indication of abnormality is the advanced suture closure in LB1. As described originally (1) and confirmed by us, "[w]ith the exception of the squamous suture, most of the cranial vault sutures are difficult to lcoate and this problem persists in computed (CT) scans." We found a portion of the right lambdoidal suture preserved ectocranially, but this level of suture closure and obliteration is atypical for any species of *Homo*, *Australopithecus*, and most nonhuman primates. Age cannot be a factor because all sutures should be open in the LB1 young adult. It may in fact have led to the neurocranial deformities discussed below. As reviewed below, we find evidence for all these signs in LB1, but we do not attempt diagnosis of a specific developmental syndrome from its skeletal remains. Rather, we simply test whether LB1 represents the developmentally normal holotype required for a new species (46) or an abnormal member of our own.

After allowance for left orbital region damage, asymmetry affects frontal breadth, position and contour of the lower orbital border, angle of inferior nasal margins, location of the (broken, off-center) nasal spine, and expression of the canine juga. Asymmetry also extends to other areas on the cranium. Detectable in the original figure 1 in ref. 1 but not mentioned, and more clearly here (see Fig. 7, which is published as supporting information on the PNAS web site), the palate midline is rotated 4–5° from the midsagittal plane, so that a line extending the midpalatine suture does not bisect the foramen magnum. In addition, right parietal and left occipital bones are flattened compared with their more rounded antimeres. The nuchal torus is markedly asymmetrical, and the antimeric mastoid regions differ greatly. This pervasive asymmetry suggests growth anomalies producing a vault and face with substantial lateral contrasts.

Patterns of asymmetry in the human skull are well documented (47–49), with typically greater neurocranial asymmetries than in the face, where asymmetries are slight overall (50, 51). For mandibular dimensions (52), the largest mean asymmetry was 0.77 mm. For the nasal region (53), the largest mean difference was 0.4 mm, with most differences <0.1 mm. The same study reported left/right orbital height variation from 0.20 to 0.39 mm and breadths from 0.00 to 0.38 mm. These differences represent small (typically <1%), fluctuating asymmetries. Reanalysis of these data (49) supported the earlier statement that "(t)he face is the most symmetrical region of the skull" (48). Similar results were obtained with radiographic and stereophotogrammetric methods (49, 54, 55). Studies of facial asymmetry are medically important and have diagnostic applications, with low single-digit lateral deviations in percentages or millimeters marking thresholds for clinical intervention (56, 57).

We quantified craniofacial asymmetry for LB1 to the extent possible by dividing digital photographs of the cranium into right and left halves along the midsagittal plane by using Photoshop (Adobe, San Jose, CA), then making composite images by mirroring the left and right sides (Fig. 2). On a digital image of the face, we also measured left and right deviations from the midline. Six of seven measures were larger on the right, by amounts ranging up to nearly 40% (distance from mental foramen to midline). The only measurement larger on the left was the 6% for distance from the orbit lateral rim to midline (see *Supporting Text*). Gauged by anthropometric (47–53, 58) and clinical (49, 54–57) standards, LB1 asymmetry exceeds clinical norms where determinable, providing evidence for rejecting any contention that the LB1 cranium is developmentally normal.

Dentition. Various aspects of the teeth are argued as taxonomically distinctive for LB1 and LB6/1 (1, 3). These traits include P_3 teeth with enlarged occlusal surfaces, P_3 and P_4 teeth with Tomes roots (indented or bifurcated), and rotated upper fourth premolars (P^4 teeth). Others, such as M1≈M2 or canines with "long roots," do not differ from common conditions in *H. sapiens* and establish no taxonomic novelty. Except for the anomalous P_3 teeth (see below), mandibular bucco-lingual breadths closely replicate modern *H. sapiens* (figure 5 in ref. 1), and data for the maxillary dentition do not differ from this assessment. Tooth size is not discordant with *H. sapiens*, as documented in the original reports (1, 3).

LB1 has enlarged, block-like P_3 teeth. These traits occur worldwide in *H. sapiens* (59–64), with examples similar to LB1 and LB6/1 common bilaterally. Variants similar to LB1, designated (63) as tooth shape deviations, also common bilaterally, are found in

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With merry jest and with joyous speed
All followed in pairs in order fine;
The Crickets and Locusts took the lead,
With others well in line,
While Moths, with Ladybirds on their right,
Preceded the Fireflies' lanterns br.ght.

The Whippoorwills, curious, hovered near,
But the Katydids gayly joined the crowd,
While the Pussybird's voice rose shrill and
clear
In cries of wonder loud;
When, each having fairest partner found,
They all in a charming ring drew round.

They danced to the music, wild and sweet,
And they danced while the winged hours
fled,
Till at length they danced, with weary feet,
To where a banquet spread
Beneath a spider web awning bright
Was in truth a glad and welcome sight.

Ambrosial honey, to each one borne
By fair Moth maidens in robes of white;
And nectar, from dewy roses shorn,
[illegible]

[illegible]
been appointed administratrix.

MONSTER EAGLE SEIZES CHILD

Father of the Little Victim Shoots the Bird as It Is About to Rise.

An eagle swooped down on a group of children who were playing in the yard of T. Smith, a farmer of Sheboygan Falls, Wis., the other day, clutched one of the little ones in its talons and was making off with its burden when it was brought down by a well-directed shot from the father of the baby, who had been brought to the scene by the screams of the children.

When struck the bird let its victim fall, but the child was not seriously hurt.

. The eagle measured 6½ feet from tip to tip of its wings.

[illegible]

Dubuque Sunday Herald
Dubuque, Iowa
06·26·1900

gned have been duly appointed and quali-
d by the above entitled Court as Executors
the estate of John J. Becker, late of said
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tice.

ROSA BECKER,
CHARLES F. BECKER,
Executors.

Dated January 7, 1901.
H. Norcross, Attorney. ja7m

PERA HOUSE STABLES

STEVE CURRIE, Prop.

PEN DAY AND NIGHT.

POPULAR PRICES.

ORSES. HACKS. BUSSES

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J. O. REBER, Trav Pass. Agt., Salt Lake City.
H. B. KOOSER, Com. Freight and Pass. Agt., Salt Lake City
Or H. C. TOWNSEND,

Stockholder's Meeting.

NOTICE IS HEREBY GIVEN THAT THE Annual meeting of the stockholders of the Southside Irrigating Canal Company will be held at the office of the Secretary, 131 Virginia street, on

SATURDAY, FEB. 23, 1901,

been appointed administratrix.

MONSTER EAGLE SEIZES CHILD

Father of the Little Victim Shoots the Bird as It Is About to Rise.

An eagle swooped down on a group of children who were playing in the yard of T. Smith, a farmer of Sheboygan Falls, Wis., the other day, clutched one of the little ones in its talons and was making off with its burden when it was brought down by a well-directed shot from the father of the baby, who had been brought to the scene by the screams of the children.

When struck the bird let its victim fall, but the child was not seriously hurt.

The eagle measured 6½ feet from tip to tip of its wings.

Epileptics in Russia.

DR. JORDAN—DISEASES OF

Call or write

DR. JORDAN & CO.,

THE
CLEANSING
AND HEALING
CURE FOR
CATARRH
is
Ely's Cream Balm

Easy and pleasant to use. Contains no injurious drug.

CATAR

Reno Evening News
Reno, Nevada
2.13.1901

[illegible] had won on merit of endurance and speed. Following are the summaries of these two noteworthy events:

July 22, Cleveland—2:09 pace, $3,000. Won by Dan R. in the fourth, seventh and eight heats. Fred S. Wedgewood, Captain Sphinx and Winfield Stratton also won heats. Time—2:08¼, 2:07¾, 2:10½, 2:08, 2:08¼, 2:10, 2:12½, 2:13¼. Average time—2:09 23-32.

Aug. 29, Providence—Roger Williams stake, 2:14 trot, $10,000. Won by Nutbearer in the fifth, seventh and eighth heats. Duke Cor, Wentworth, Alice Carr and Hythmic (distanced) also won heats. Time—2:09¼, 2:08¾, 2:09¼, 2:06½, 2:10¾, 2:12¾, 2:10¾, 2:12. Average time—2:10¼.

CORBETT TO GET BIG SHARE.

Win or Lose, Denverite's Part of the Purse Will Be Large.

NEW YORK, Jan. 3.—Terry McGovern's desire to regain the featherweight championship of the world by beating "Young Corbett" is very evident by his agreement to meet the

George Slosson has decided not to participate in the world's championship billiard tournament, in Paris. Schaefer and Sutton will be the only American contestants.

SHOT A MONSTER EAGLE.

A Lafayette Township Lad Kills Big Bird With a Target Rifle.

Yesterday afternoon a large American eagle floated over the Peter Nicodemus farm in Lafayette township. The eagle devoted most of his time circling around a flock of turkeys in a corn field. Fred Nicodemus, a fifteen-year-old lad, discovered the eagle and went after his target rifle as the bird was about to carry off a turkey. He fired one shot from his small gun and it proved effective. The large bird dropped dead. Its spreading wings measure seven and one-half feet from tip to tip. It is one of the largest specimens ever seen in Fort Wayne.

Of Local Interest.

Mayor C. A. Bookwalter, of Indian-

BERLIN, Jan. 3.—King Georg
Saxony, it is announced this mor
is slowly sinking. His fever i
creasing, pulse weakening and
physema has occurred between
heart and lungs, which greatly
gravates his condition. Milk is
the only nourishment he can
The royal physicians believe th
ment is approaching when the C
Princess Louise, whose elopment
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BOY GRABS HER PU

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Chief Usher Gives Chase and R
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Five—"A Desperate Chance."

Fort Wayne News
Fort Wayne, Indiana
1-3-1903

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consumer. The charge is made by a number of Coshocton consumers that in some cases only thirty-two to thirty-five bushels are delivered to the load when there should be forty.

MONSTER EAGLE
CAUGHT AT BLUFF

A large eagle is attractin attention at the C. M. Hay jeweler store today. It was captured near Bluff, fifteen miles from here, by Ed. D. Fry. It is the largest one of its kind ever seen in this part of the country. It measures seven feet and one inch from tip to tip.

THIRTY ASPIRANTS

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Coshocton, ohio

1-27-1903

rehearsing at Mason City some time this month.

If a man only had a ton of whalebone he would be in luck, as it is now selling at $1500 per ton.

The servant girls of Waterloo have organized a union and will demand more pay and shorter hours.

"Billy" Sunday is said to have had 516 converts in his special meetings in Jefferson, Iowa, which closed last week.

Dan Easton is engaged in the real estate business and says he is prospering. He and family like their new home.

Iowa has cash in its treasury to the amount of $1,935,486.20, and of this amount $1,190,443.06 is in the general

ience and seemed to please everybody. Manager Beck is booking good clean attractions and deserves a liberal patronage. Remember the "Golden Gaint Mine" will be given Feb. 5th.

A Monster Eagle Captured By Dan Easton and Dan Carney.

The Herald of Los Angeles, California, gives a thrilling account of the chase and capture of a monster eagle near that city by our former townsmen Dan Easton and Dan Carney. The bird when discovered showed signs of great fatigue, but put up a plucky fight until the last when he got tangled in the brush and the struggle was over.

John Wade Much Better.

in composition writing.

At the home of Mable McGee on Friday night the Athenian and Star literary societies will entertain the members of the O. K. literary society.

The fifth month examinations will be held at the close of next week.

Miss MacDonald has given the following report of her room for last month:

No. pupils enrolled	33
No. days lost by absence	38¼
No. cases tardiness	15
No. neither absent nor tardy	11
Average per cent of attendance	90

Pupils neither absent nor tardy during the month:

George Berger
James Hurd
Willie Moon
Roberta Boggs
Ruby Mauch
Henry Hildebran
Roy Koehn
Hilda Sylvester
Hubie Meek
Walter Thorp
Clarence Wood

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Iowa Reporter
Greene, Iowa
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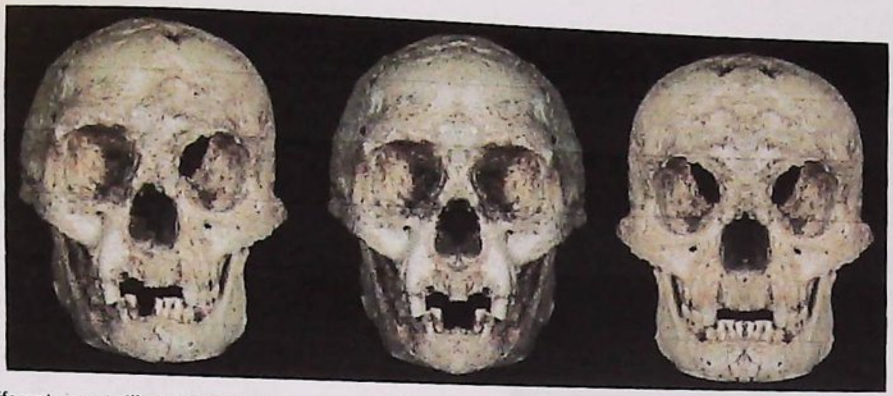

Fig. 2. LB1 in three different views to illustrate facial asymmetry. (*Left*) The actual specimen. (*Center*) The right side doubled at the midline and mirrored. (*Right*) The left side doubled and mirrored. Differences in left- and right-side facial architectures are apparent and illustrate growth abnormalities of LB1. (Original photograph in *Left* is by E.I.; original photographs in *Center* and *Right* are by D.W.F.)

worldwide samples including Amerinds (59), Japanese (60), New Guineans (61), and at ≈3% in a mixed Euro-African-Native American sample (62). Overall (64), "lower premolars present wide variation [in *H. sapiens* and] there is no such thing as a premolar that is typical of its group."

Tomes roots also are frequent in *H. sapiens* populations (65–67) and are part of the standard Arizona State University dental recording system (66, 67). Tomes roots in P_3 teeth reach frequencies as high as 37% in non-Khoisan sub-Saharan Africans (68) and 15–25% in Sunda-Pacific populations (69). Lower frequencies (≈4%) are found in P_4 teeth (70). Thus, Tomes roots on LB1 in either P_3 or P_4 are completely within expectations for *H. sapiens* populations from the region.

It was argued (1) that the P^4 teeth of LB1 are "unusually, . . . rotated parallel [sic] to the tooth row, a trait that seems to be unrecorded in any other hominin." However, dental rotation is common in modern *H. sapiens*, typically indicating developmental abnormality, crowding, or agenesis (71). No other maxillae are known from the Liang Bua Cave sample, but it is highly unlikely that any species of *Homo* normatively would have bilaterally rotated upper premolars because this anomaly clearly would interfere with occlusion. In the Rampasasa sample, 13 of 50 individuals (26%) show premolar crown rotation ranging from slight to 90°. None show bilateral rotation of maxillary premolars, but a 32-year-old female has a left P^3 rotated perpendicular to the tooth row, and a 25-year-old female has a right P_4 rotated almost 90° (Fig. 3). Although more work needs to be done on the etiology of dental rotations, living pygmy groups from Flores exhibit tooth rotation more commonly than other extant human populations.

Other dental traits linking LB1 to modern pygmies from the Liang Bua region include a tendency for the longitudinal fissure to shift away from the buccolingual axis on lower molars, tremata (spaces between teeth), rhomboid outlines of upper molars reflecting hypocone reduction, squared lower molar outlines related to hypoconulid loss, and large buccolingual P_3 diameters. Overall, the dentition of LB1 exhibits modern human traits, with bilateral rotation of the upper fourth premolars and tooth shape deviations in lower premolars, both of which seem to occur at elevated frequencies in the Rampasasa.

Postcrania. Throughout the postcranial skeleton is evidence that contradicts any notion that LB1 is normal (see also *Supporting Text*). For example, the right humerus shaft of LB1 (Fig. 4) appears thick in relation to its length and epiphyseal dimensions, but the superficial appearance of robusticity is contradicted by very weakly marked muscle attachment sites. The deltoid tuberosity is poorly developed, and below it the shaft does not narrow to the usual extent. The humeral torsion angle of 110° is reported as falling outside the 141° to 178° hominin range but corresponding to norms in *Hylobates* and *Macaca*, implying that the extent of humeral torsion reflects only phylogenetic information (3). However, torsion of the humerus is in part ontogenetic (72) and a response to the dynamic forces exerted by shoulder rotators on the growing bone. Because the lateral rotators insert within the proximal epiphysis whereas most of the medial rotators act distally on the shaft, forces working in opposite directions during development normally add 32° of secondary torsion (73, 74) characteristic of hominins. In contrast, the abnormally low amount of humeral torsion in LB1 is consistent with the extremely weak muscle development indicated by muscle insertions.

The right ulna is missing its most distal portion. The midshaft sagittal diameter is 12 mm, the same value estimated for the partial ulna recovered from the SAS (shell and sand) member in cave 1A at Klasies River Mouth (75), with both specimens being larger in this dimension than a small San reference sample (mean 11.1 mm, $n = 8$) and an Australian reference sample (mean 11.6 mm, $n = 4$).

The holotype statement (1) describes and illustrates a "right" complete femur, but this bone is a left femur. Largely complete but for a missing lateral condyle, it has a prominent lesser trochanter with lipping in its anterior portion. The true right femur is truncated postmortem proximally by loss of the greater trochanter, most of the neck, and the entire head. Proximally, the intertrochanteric crests on the femora are highly asymmetrical (larger on right), with sizes and positions of lesser trochanters differing substantially between sides (Fig. 5). On the right, the spiral line, adductor insertions, and lateral gluteal lines converge toward the midshaft,

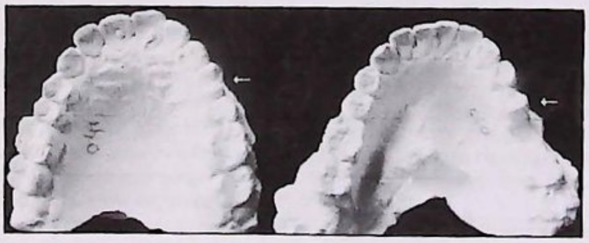

Fig. 3. Partial to 90° premolar rotation is common in the Rampasasa pygmy sample from Flores. (*Left*) Rampasasa 041 is a 32-year-old female showing an upper left third premolar with 90° rotation, so that the buccal aspect is in the mesial position (arrow). All other teeth in both jaws are positioned normally. (*Right*) Rampasasa 033 is a 25-year-old female with a lower right fourth premolar rotated nearly 90°, with the usual buccal aspect oriented distally here (arrow). The tooth also has an anomalous shape, resembling an upper premolar. (Original photographs are by E.I.)

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Page From Latin Psalter of 1459.

temporary monastic binding in pigskins, with oaken boards and metal clasps. Only twelve copies are known to exist, and it is believed that only twenty were printed. Four thousand pounds sterling was paid for this treasure by Herr Baer, the German bookseller, who purchased it on behalf of his firm, Messrs Joseph Baer & Co., Frankfort-on-the-Main.

FOUGHT WITH MONSTER EAGLE.

Youth Battles for Life with Monarch of the Air.

News has reached here of a terrible fight C. D. Estill *had a few days ago* with a monster eagle near Philo, says a dispatch from Ukiah, Cal. Estill was plowing and noticed a large bird in a tree. He stopped his work and when he saw it was an eagle he began throwing rocks at it.

The bird was hit several times and commenced circling around overhead, too high for Estill to throw. Estill was standing by a picket fence watching the maneuvers of the bird, when it suddenly swooped down and struck him a terrific blow with its wings.

Estill grabbed a picket from the fence and then began a battle for life that eventually ended in the killing of the eagle. Time after time it came at the *boy* and struck him with its wings and beak, sometimes receiving blows from the picket in return. Es*till succeeded in breaking one of the* eagle's wings, but did not drive it away.

Both were becoming weak, and the eagle managed to stick his talons in the boy's arm, nearly tearing it from his shoulder and causing him to faint.

When he recovered the eagle was lying dead but a few feet from him.

The eagle measured ten feet from tip to tip and had talons eight inches long. Estill is still under the doctor's care.

Has Potato Vine in Cellar.

When Charles H. Ballard of Oxford put his potatoes in the cellar last fall some of them got buried in the dirt. Mr. Ballard recently went into the cellar to sort over the potatoes and found some flourishing vines. He pulled up *some of them and found pota*toes as large as a hen's egg. He says the Ballard family are now eating new potatoes and they say they are as good as potatoes dug in the field in August.

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Suburbanite Economist
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Pythian Orphan's Home.

Conferring the grand lodge degree on past chancellors.

EVENING SESSION, 7:00 O'CLOCK.

Production of Daman and Pythias by Van Wert lodge.

Music.

Address by Grand Keeper of Record and Seal Beatty, of Toledo.

Music, The Montpelier Quartette.

Address, "Seventy-five Thousand," Grand Chancellor J. D. Clark, of Dayton.

Music, male chorus and orchestra from Defiance lodge.

The meeting will close with a luncheon.

NEARBY HAPPENINGS.

Onions Yield a Great Profit to a Wyandot County Farmer—Big Eagle Killed.

Ross Shafer, who resides upon the Turley farm, east of Moffit Station, shot a large eagle Saturday near his home, which had taken up its abode in a large black walnut tree, overlooking the farm poultry yard. It was a monster bird, weighing twelve pounds and measuring seven feet from tip to tip. It had been seen hovering over this section for some days by different parties, and was fired upon several times. The Shafers had been losing their autumn pigs very mysteriously for some time and it is now suspected that this monstrous bird has been preying upon the occupants of Mr. Shafer's swine pens for some time past. The bird was brought to Findlay and will be mounted by parties versed in taxidermy and placed upon exhibition. It is indeed a rare bit of game for this section and excited considerable curiosity in the event of capture.—Findlay Republican.

◆

The record of onion raising on the big Scioto marsh has been broken by John B. Stambaugh of near Upper Sandusky in his shipment to New York, several days ago, of a special consignment of white silver skin variety, his own origin. He put out 10 acres last season, from which he harvested 5,600 bushels, disposing of them at $1.10 per bushel. His entire crop amounted to nearly 7,000 bushels. The silver skin variety netted him $616 per acre and were for a special trade. On the ten acres planted he used 1,300 pounds of the most expensive fertilizer.

◆

In the Maimi County Common Pleas Court a judgment of four cents was rendered for U. S. Heckman against the D. & T. Traction Co. He sued for $1,000 damages because a conductor on the Lima Limited refused to honor a commuter ticket on that car.

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Van Wert Daily Bulletin
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After a Monster Eagle.

Spokane, Wash., March 21.—Harry Morse of Washtucna and a number of ranchers of the district south of Spokane have gone to the mountains two miles below to capture a monster eagle which has been causing all sorts of havoc in that neighborhood. Those who have seen the bird declare it has a spread of wings measuring from 10 to 12 feet. Hundreds of shots have been fired at the eagle, but as yet none has hit it.

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Bismark Daily Tribune

Bismark, ND
3.22.1907

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female trouble.
Lydia E. Pinkham's
Vegetable Compound has restored
me to perfect
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Senor Arosemena, the Panaman minister, entered a protest at the state department, Washington, against the speech made in the house by Congressman Rainey of Illinois, in which President Obaldia was severely attacked.

A monster eagle swooped down and seized the three-year-old daughter of Josiah Olmtree, a farmer, near the town of Pitcairn, N. Y., but was driven off by the child's father before it could fly away with its intended victim.

Battered about for seventy-two hours by terrific gales and without

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SPORTING AFFAIRS. Tom Longboat, the great Canadian Indian runner, defeated Alfred Shrubb, the English middle distance champion, in their Marathon race at Madison Square Garden after being nearly a mile behind and apparently out of it. Shrubb collapsed at the twenty-fourth mile. Time, 2 hours 53 minutes 40 2-5 seconds.

First Baseman Hal Chase of the New York American league club, who deserted his team last year and was suspended by the national commission, was reinstated conditional upon the payment of a fine of $200. Jake Wei-

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Hopewell Herald

Hopewell, NJ

2-10-1909

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sure that the hogs and pigs have s to charcoal and salt.

at the cows kindly. You will more milk in this way than by l methods.

dream is a good investment to in stock. Costs no money, but es a money return.

n't crowd the chicks in the brood- From start to finish chickens do well when crowded.

commodious tool shed is an equip which every farm should have which in too many cases is ab

ck up around the place this year see if the neighbors don't catch fever. A good example goes a ways.

handling young chicks be careful to overfeed. There is as much in this way, if not more, than by r feeding.

eep keep the land looking trim. you never noticed how slick the pastures and roadsides look on farm where sheep are kept?

member that there is scarcely a on the farm but that can be e to return a profit. Study its acteristics. If not good for one g it may be good for another.

the hog yard put a few short s, around which fasten some old ding securely. Saturate with kero- and the hogs will do the rest to stray lice wandering over their omy.

use your own timber. Plant trees y year. Put them in every avail- place. They will not only provide table shade if well placed, but grow timber which will prove able in the years to come.

your work neatly. If it is ding the wagon, don't get the e all over the wheels as well as te axle or on your clothes, eith- Some men think hurry means py methods. It's a mistake.

you have not already provided a rator for the handling of your t it will be well for you to con- the proposition, for it not only es the handling of the milk and m easier, but gives you sweet t to feed to the hogs.

arden all planned for? Surely you not going to let another season without that promised luxury. It little work, but you will be more repaid next summer when you enjoying the fresh things you can r on the little patch near the se.

he surest method of killing all ver- and disease germs in the chicken se is to fumigate by burning sul- r. No living germ or animal can l in the presence of sulphurous gas. It finds its way into every k of the room and makes complete ruction in its path. When fumi- ng, remove all of the fowls, make room perfectly tight, and burn the hur with live coals or on a redhot el.

eat the seed oats if there is any ger of smut. Get a half pound of nalin, add 39 gallons of water, ead the oats out on the barn floor sprinkle the solution over them until the grain quite damp. Then vel together into a pile and cover h sacking and leave for about two rs. If not sowed at once, spread and dry thoroughly. Thirty gal- of the solution will treat 150 bush- of oats.

rilling in oats is much to be pre- ed to broadcasting. The seed is h more evenly covered and more nly distributed throughout the h. From one to two pecks per may be saved in the amount of needed. At the Iowa station for 7, with its cold, dry spring, the ilts in favor of drilling over broad- ting were very marked. An in- ase of over nine bushels per acre secured in favor of drilling. When is figured at the rate of 33 1-3 ts per bushel, we find that less n 35 acres of oats would have paid a drill in that one season. In sea- s more favorable for oats produc- , this difference is by no means as rked, yet the drilling can be rec- mended as a much more profitable ns of putting in oats than the mon system of broadcasting.

imply because a young sow gets h pig because allowed to run with herd, and then kept as one of the ular brood sows of the farm is the son that the grade of some farm- hogs are running down. Such eless, irregular methods mean ruin the farmer. In the first place dif- ent sizes and ages of hogs should be kept in the same pasture or It is not best from a sanitary nt of view, and small pigs cannot ure their share of food with a ch of older hogs. Male pigs should castrated at an early age to pro- e growth and to prevent them n mating with the females. The r to be kept for breeding purposes uld be of the very best type and d that can be secured. He must the kind that is known positively get good young. He should be kept separate inclosure by himself and sows turned to him only at times n the mating will bring the litters proper dates.

FIGHTS BIG EAGLE TO SAVE BABY BOY

ILLINOIS FARMER IN DESPERATE CONFLICT WITH MONSTER MONARCH OF THE AIR.

STRUGGLE LASTS TWO HOURS

Giant Bird's Wings Are Broken and It Is Finally Overcome with Help of Neighbors—Measures Twelve Feet.

St. Charles, Ill.—Fighting desperately for two hours with a monster eagle to keep his baby from the menacing talons of the great bird, Peter Johnson, a farmer, with the aid of neighbors, finally captured the king of the air.

Fully a score of persons participated in the conflict with the eagle, and pitchforks, clubs and stones were brought into service before the bird, exhausted from his efforts, gave up the battle. Johnson was terribly scratched in the encounter, although his son was unhurt.

The Johnson boy, a sturdy child of three years, was playing on his father's farm near St. Charles the other morning when the eagle was first observed.

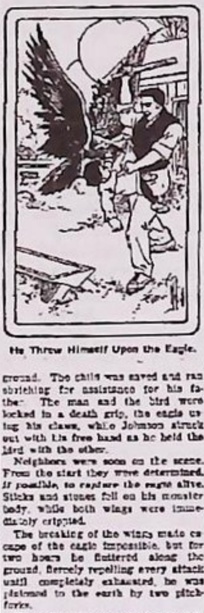
The great bird circled about the vicinity at a great height for several minutes. Suddenly, with the speed of a lightning flash, it darted down, and its steel-like talons caught in the child's dress.

The child's surprise for a second struck him dumb, and the eagle, using every ounce of its strength, bore the boy upward. Surprise gave way to alarm. The child screamed for aid and struggled vigorously to free himself from the eagle's clutches.

The boy is a stockily built lad, weighing about 35 pounds, and the bird was unable to make great progress.

The father heard the screams of his child and hurried from his house. He saw the boy in the bird's clutches and ran toward the scene of the struggle.

With all his strength he threw himself on the eagle and bore it to the



He Threw Himself Upon the Eagle.

ground. The child was saved and ran shrieking for assistance for his father. The man and the bird were locked in a death grip, the eagle using his claws, while Johnson struck out with his free hand as he held the bird with the other.

Neighbors were soon on the scene. From the start they were determined, if possible, to capture the eagle alive. Sticks and stones fell on his monster body, while both wings were immediately crippled.

The breaking of the wings made escape of the eagle impossible, but for two hours he fluttered along the ground, fiercely repelling every attack until completely exhausted, he was pinioned to the earth by two pitchforks.

The eagle when measured proved to be 12 feet from tip to tip of his wings and a perfect specimen of its kind. It is believed he will speedily recover from the injuries in its struggle with the men, and Johnson plans to present it to some zoological garden.

Although Johnson is suffering intense pain as a result of the scratches received in the fight, none of his hurts is regarded as dangerous, the worst wound being an immense gash torn in his left shoulder. He was greatly weakened from loss of blood.

The boy is none the worse for his experience and takes great delight in watching the imprisoned bird.

Cold Dip Restores Girl's Voice.

Los Angeles, Cal.—Miss Bernice Pooler, a visitor from Philadelphia and a deaf-mute since babyhood, regained her speech and hearing, following a sudden plunge in the Pacific ocean at Balboa beach.

The bath was involuntary. She lost a pair of valuable gold combs and a diamond pin, besides getting a shock and ruining her gown—but she says it was worth it.

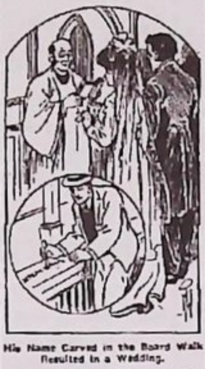
Miss Pooler lost her speech and hearing by falling into a lake in Pennsylvania when she was an infant, 19 years ago, and has not heard a sound or spoken a word since. To-day she is garrulous, as she puts it.

USE OF PENKNIFE WINS SEATTLE MAN A BRIDE

CARVED HIS NAME ON WALK, SHE SAW IT, AND SENT HIM A POSTAL CARD.

Trenton, N. J.—Cupid's success in bringing two young people to the altar was due to a name carved in a pavilion on the board walk in Cape May and to a penny souvenir postal card. The principals in this little romance are Miss Anna Clark, whose home is near Lawrenceville, and Joseph Brodus, a contractor of Seattle, Wash. They were wedded here the other day.

In 1907 Mr. Brodus visited the Jersey summer resort. While sitting in a pavilion on the board walk one afternoon he carved his name with a penknife on a beam of the structure. A few weeks later Miss Clark spent a vacation in Cape May, and while with a



His Name Carved in the Board Walk Resulted in a Wedding.

crowd of girls espied the name, "Joseph Brodus, Seattle, Wash." in the pavilion. She called the attention of her companions to the name and some one suggested, in jest, that the owner of the name would be surprised if he received a postal. The idea appealed to Miss Clark and that night Uncle Sam carried in one of his mail bags a penny souvenir postal directed to Mr. Brodus, with these words: "Are you in the habit of leaving your name behind you in every place you visit? I suppose you want Cape May folks to remember you." Miss Clark not only signed the card, but gave her home address.

The incident had been forgotten by her a month afterwards, but was vividly recalled to her memory when she received a letter from Mr. Brodus. The letter thanked the sender of the postal for calling the writer's attention to his boyishness and explained the circumstances.

Although realizing it was unconventional, Miss Clark could not resist the temptation to answer the letter, apologizing for her boldness in addressing a stranger. This missive was answered and the romance was not like others, inasmuch as there was no long distance lovemaking before the principals met.

Cupid prompted Mr. Brodus to make another trip east last summer, and he went to the home of Miss Clark, where he introduced himself. While surprised, the girl received him. He learned that several old friends of his lived in this region, and through these he convinced Miss Clark that his standing in the community in which he lived was extremely good. He remained longer than he intended. The friendship which sprang up between the two ripened into a deeper affection, and a second visit of the Seattle man last September resulted in the engagement.

"I had a premonition that something would result from the sending of that postal," said the bride.

DIGS 10 MILES THROUGH SNOW

Colorado Prospector Reaches City from Mountain Cabin More Dead Than Alive.

Buena Vista, Col.—Almost dead from sheer exhaustion and starvation in battling with the fierce elements, Samuel Denny, an old prospector, living near the head of Cottonwood pass, west of Buena Vista, who had been snowbound for over 30 days, stumbled into the Hotel Buena Vista at Hot Springs, six miles west of Buena Vista, after a trip of four days, covering a distance of over ten miles from his lonely cabin in the mountains to the springs.

Denny would shovel out a trail for a distance and then return to his cabin for rest and food. Again he would tackle the drifting snow, sometimes shoveling through drifts 30 and 40 feet deep. In this manner and in constant danger of being engulfed in snowslides which many times blocked the trail behind him, he finally reached the springs, more dead than alive.

Denny lives at the head of Cottonwood pass, where he has located a ranch and has a number of cattle, all of which he says will die. He has already lost four from hunger and cold. He was compelled to constantly shovel snow so the cattle could get water to drink.

This finally overcame the man, who is nearly 73 years of age, and, seeing that he could not save the rest of his cattle without help, and finding his provisions running low, he started for the nearest place, Buena Vista Hot Springs.

Do You Feel Like This?

Does your head ache or simply feel heavy and uncomfortable? Does your back ache? Does your side ache? Do you feel fagged out? The tonic laxative herb tea known as Lane's Family Medicine will clear your head, remove the pain in side or back and restore your strength. Nothing else is so good for the stomach and bowels. At druggists' and dealers', 25c.

Unlikely.

Whale—What are you going to tell your wife when you get home?

Jonah—I don't know; I don't suppose she would believe me if I should tell her that I had been to a fish dinner.—The Bohemian.

Ask Your Druggist for Allen's Foot-Ease.

"I tried ALLEN'S FOOT-EASE recently, and have just bought another supply. It has cured my corns, and the hot, burning and itching sensation in my feet which was almost unbearable, and I would not be without it now.—Mrs. W. J. Walker, Camden, N. J." Sold by all Druggists, 25c.

The habit of viewing things cheerfully and of thinking about life hopefully, may be made to grow up in us like any other habit.—Smiles.

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There are literally hundreds
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Read what these women say

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"I suffered from pains in my b
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made me a well woman—and
always have my praise."—Mrs.
Ave., Camden, N. J.

Erie, Pa.—"I suffered for five y
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For 30 years Lydia E. Pinkham
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FIGHTS BIG EAGLE TO SAVE BABY BOY

ILLINOIS FARMER IN DESPERATE CONFLICT WITH MONSTER MONARCH OF THE AIR.

STRUGGLE LASTS TWO HOURS

Giant Bird's Wings Are Broken and It Is Finally Overcome with Help of Neighbors—Measures Twelve Feet.

St. Charles, Ill.—Fighting desperately for two hours with a monster eagle to keep his baby from the menacing talons of the great bird, Peter Johnson, a farmer, with the aid of neighbors, finally captured the king of the air.

Fully a score of persons participated in the conflict with the eagle, and pitchforks, clubs and stones were brought into service before the bird, exhausted from his efforts, gave up the battle. Johnson was terribly scratched in the encounter, although his son was unhurt.

The Johnson boy, a sturdy child of three years, was playing on his father's farm near St. Charles the other morning when the eagle was first observed.

The great bird circled about the vicinity at a great height for several minutes. Suddenly, with the speed of a lightning flash, it darted down, and its steel-like talons caught in the child's dress.

The child's surprise for a second struck him dumb, and the eagle, using every ounce of its strength, bore the boy upward. Surprise gave way to alarm. The child screamed for aid and struggled vigorously to free himself from the eagle's clutches.

The boy is a stockily built lad, weighing about 35 pounds, and the bird was unable to make great progress.

The father heard the screams of his child and hurried from his home. He saw the boy in the bird's clutches and ran toward the scene of the struggle.

With all his strength he threw himself on the eagle and bore it to the

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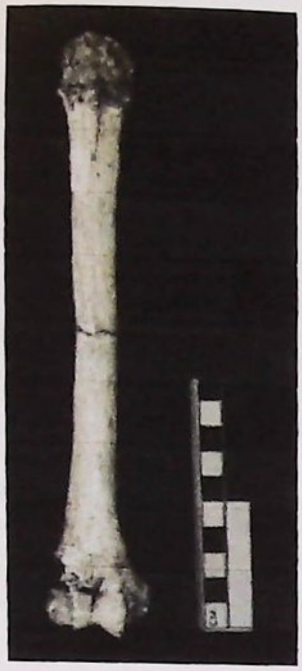

Fig. 4. Anterior aspect of the humerus. Note near absence of deltoid tuberosity as well as minimal difference in subdeltoid and supradaltoid width of the shaft. These indicators of extremely weak muscle development are consistent developmentally with an abnormally low degree of humeral torsion.

where they run parallel for only ≈30 mm before dividing again into borders of the popliteal surface. These lines are barely visible, even in the middle of the shaft, unlike a normally robust and prominent *linea aspera*. The arrangement of muscle attachments is similar on the shaft of the left femur, but lines are not visible distally. Such atypical features imply severe muscle hypotonia (paresis) during life, associated with complications of abnormal growth.

Right and left patellae are completely preserved, and like the femora show asymmetry, with the left patella ≈10% longer superoinferiorly. The right tibia is complete, except for the medial malleolus and the area immediately proximal, whereas the left tibia lacks both proximal epiphysis and medial malleolus. Tibial shafts are oval in cross-section rather than approximately triangular (see *Supporting Text*), an unusual feature suggesting compromise between the need to support and move body mass and generally weak muscle development.

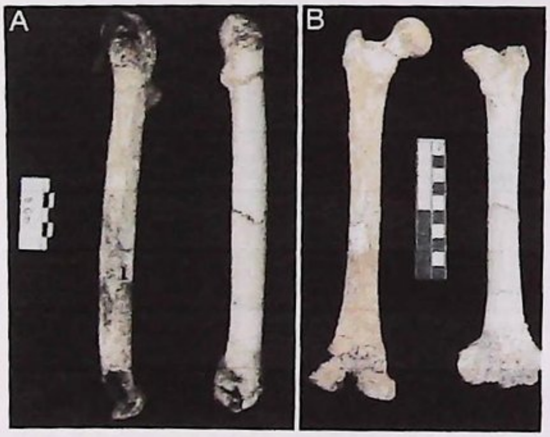

Fig. 5. LB1 femora. (*A*) Lateral views of both femora, showing antimeric contrasts in diameters as well as sizes and orientations of lesser trochanters. Note thin cortex in the small postmortem break on shaft of left femur. (*B*) Posterior aspect of both femora. Note shortness of linea aspera and large size of popliteal areas.

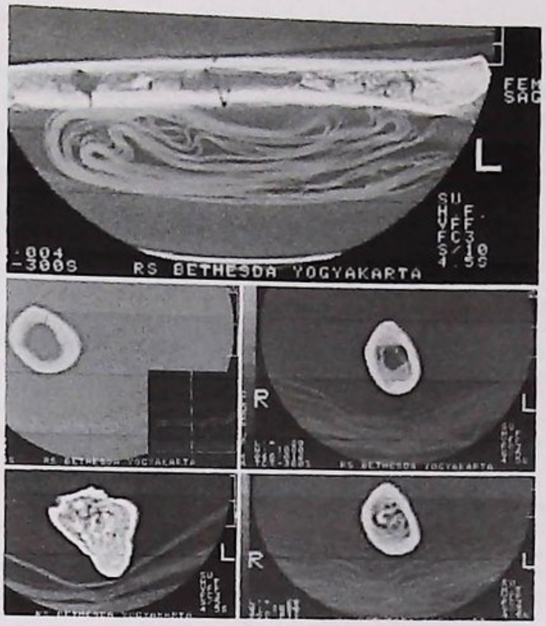

Fig. 6. CT scans of LB1 leg bones (vertical scales are subdivided into 10-mm units). (*Top*) Longitudinal scan of the left femur (up, anterior). (*Middle*) Midshaft cross-section of left (*Left*) and right (*Right*) femora (in all cross-sections, down is anterior). Note differences in cross-sectional outlines and internal structures, indicative of same evident left-right asymmetry also seen in Fig. 5. (*Bottom Left*) Cross-section of left tibia at level of tibial tuberosity. (*Right*) Cross-section of left tibia at midshaft. Note that cortical bone (completely radio-opaque area) in all sections is only ≈2 mm thick, abnormal for an adult primate of either sex, and body length >1 m.

Repeated statements that the long bones are "robust" reflect the observation that they are large in diameter and circumference proportionate to their length, but also imply that they are massive and strongly developed (see also *Supporting Text*). Ratios of shaft circumference to LB1 maximum long bone lengths do seem unusually large. For the left femur it is 38.4%, whereas in our modern Indonesian reference skeleton and the LB78 femur excavated in upper layers of Liang Bua, the values are 26.6%. Similarly, the ratio for the right humerus is 30.9%, against the normal adult Indonesian reference specimen's 24.8%. The ratio for the LB1 tibia is 29%. However, CT scans of diaphyses show thin (≈2 mm) cortical bone and very large marrow cavities (Fig. 6), providing further evidence that shafts of long bones of LB1 are abnormal (16). Inflated circumferences, combined with very thin cortical bone showing very weak muscle markings, indicate not robusticity, but long bone overtubulation indicative of disordered growth.

Additional postcrania (3) generally are consistent with inferences that the Liang Bua Cave population was small-bodied. However, the most recently described material does introduce some additional conundrums. For example, the LB8 tibia, with an estimated length of 216 mm, is used to reconstruct a stature of 1.09 m, greater than that of LB1 at 1.06 m, although LB1 tibia length is 235 mm. Importantly, none of the newly described postcranial bones (3) nor LB6/1 indicate anything about the neurocranial dimensions of individuals from which they were sampled.

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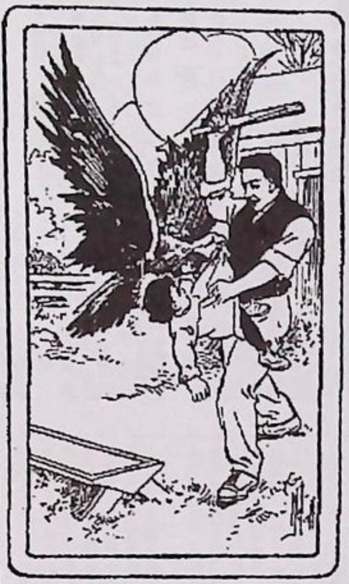

He Threw Himself Upon the Eagle.

ground. The child was saved and ran shrieking for assistance for his father. The man and the bird were locked in a death grip, the eagle using his claws, while Johnson struck out with his free hand as he held the bird with the other.

Neighbors were soon on the scene. From the start they were determined, if possible, to capture the eagle alive. Sticks and stones fell on his monster body, while both wings were immediately crippled.

The breaking of the wings made escape of the eagle impossible, but for two hours he fluttered along the ground, fiercely repelling every attack until, completely exhausted, he was pinioned to the earth by two pitchforks.

The eagle when measured proved to be 12 feet from tip to tip of his wings and a perfect specimen of its kind. It is believed he will speedily recover *from the injuries in its struggle with* the men, and Johnson plans to present it to some zoological garden.

Although Johnson is suffering intense pain as a result of the scratches received in the fight, none of his hurts *is regarded as dangerous, the worst* wound being an immense gash torn in his left shoulder. He was greatly weakened from loss of blood.

The boy is none the worse for his experience and takes great delight in *watching the imprisoned bird.*

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Our reexamination of the original skeletal material shows that there is insufficient morphological or metric evidence for a new hominin species on Flores, where evolution over millennia in total isolation is unproved, unlikely, and at variance with *Stegodon* migrations and glacial geology. The skeletal material excavated from the Liang Bua Cave represents individuals sharing small body size, although unlikely as diminutive as proposed, plus some dental and other traits previously documented. Such commonalities are expected on grounds of shared environment and relationship in a local group, as are variations due to age, sex, microevolutionary trends, and other intraspecific factors. Against this background, rather than exhibiting "a mosaic of primitive, unique and derived features not recorded for any other hominin" (1), the LB1 individual exhibits a combination of characters that are not primitive but instead regional, not unique but found in other modern human populations, particularly some still living on Flores, and not derived but strikingly disordered developmentally.

Materials and Methods

Standard osteometric instruments were used for skeletal measurements, and a whole-body scanner (Toshiba, Tokyo, Japan) at the Bethesda Hospital in Yogyakarta (Indonesia) was used for CT scans. During our study of the bones at the Laboratory of Bioanthropology and Palaeoanthropology at Gadjah Mada University (Yogyakarta, Indonesia), direct comparisons of their size and morphology were made with an adult male Indonesian reference skeleton (*in vivo* stature ≈1.55 m), supplemented with published data on skeletal variation, particularly human skeletons excavated earlier on Flores (38) and in Australomelanesians (39–41). In April, 2005, a team led by T.J. studied Rampasasa pygmies in Waemulu village, ≈1 km from Liang Bua Cave.

We thank M. Mudjosemedi for dental casting; J. Hastuti, Koeshardjono, N. T. Rahmawati, and R. A. Suriyanto for assistance with research on the Rampasasa; and A. G. Fix, J. Hawks, I. Hershkovitz, R. D. Martin, J. Monge, and P. V. Tobias, all of whom read and commented in detail on the manuscript. Chief Investigators of the joint research project between Indonesian National Research Center of Archaeology (NRCA) and the University of New England (Australia) (R.P.S. and M. Morwood) agreed in accordance with Clause 5 of the Agreement of Research on Liang Bua that they will invite other researchers to participate in the Project after the Australian expert in paleoanthropology has completed his research on the Liang Bua human skeletal remains. Thus, T.J. was given the opportunity to carry out research on the subject in November 2004. T.J. was supported by NRCA for the transportation of the Liang Bua remains from NRCA to the Gadjah Mada University, Yogyakarta. The Rampasasa Pygmy study in Flores was supported by Gadjah Mada University and the Max Planck Institute for Evolutionary Anthropology (Leipzig, Germany). R.B.E. received support for travel from the College of Health and Human Development of the Pennsylvania State University.

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cid gas. It finds its way into every
rack of the room and makes complete
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ating, remove all of the fowls, make
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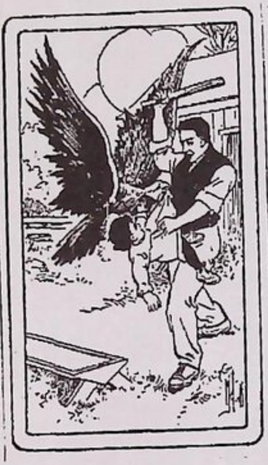
anger of smut. Get a half pound of
ormalin, add 30 gallons of water.



you in the habit of leaving your name behind you in every place you visit? I suppose you want Cape May folks to remember you." Miss Clark not only signed the card, but gave her home address.

The incident had been forgotten by her a month afterwards, but was vividly recalled to her memory when she received a letter from Mr. Brodus. The letter thanked the sender of the postal for calling the writer's attention to his boyishness and explained the circumstances.

Although realizing it was unconventional, Miss Clark could not resist the temptation to answer the letter, apologizing for her boldness in addressing a stranger. This missive was unanswered and the romance was not like others, inasmuch as there was no long-distance love-making before the principals met.

Cupid prompted Mr. Brodus to make another trip east last summer, and he went to the home of Miss Clark, where he introduced himself. While surprised, the girl received him. He learned that several old friends of his

benefit of this valuable remedy.
"I suffered from pains in my back and side, sicl
no appetite, was tired and nervous all the time, a
could hardly stand. Lydia E. Pinkham's Vegetabl
made me a well woman—and this valuable me
always have my praise."—Mrs. W. P. Valentine,
Ave., Camden, N. J.

Erie, Pa.—"I suffered for five years from female
at last was almost helpless. I tried three doctors
me no good. My sister advised me to try Lydia I
Vegetable Compound, and it has made me well a
hope all suffering women will just give Lydia E
Vegetable Compound a trial, for it is worth its wei
—Mrs. J. P. Endlich, R. F. D. 7, Erie, Pa.

Since we guarantee that all testimonials wh
lish are genuine, is it not fair to suppose that
Pinkham's Vegetable Compound had the vi
these women it will help any other woman w
ing from the same trouble.

For 30 years Lydia E. Pinkham's Vegetable Compound has been the standard remedy for female ills. No sick woman does justice to herself who will not try this famous medicine. Made exclusively from roots and herbs, and has thousands of cures to its credit.

If the slightest trouble appears which you do not understand, write to Mrs.

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7

D

or sugges-
ons upon

Reese.

Reese Brothers did difficult acts in gun spinning and acrobatic work. They were well received.

Willie Nowal, the boy singer, has a good voice and sang two selections.

"Southland," a comedy musical sketch made a bit, and many catchy songs by Miss Jesse Nickens, won favor. Many dances were also introduced.

Tonight and Saturday night, from reports heard after last night's performance, good houses are predicted.

Tonight a change of program will be made. The prices remain the same, 10, 20 and 30 cents.

king. Then the plot thickens.

The musical numbers in the "Isle of Spice" have become famous and include "The Goo Goo Man," "Peggy Brady," "Silly Sailors," "You and I."

Flight of Monster Eagle Noted.

A monster eagle with white head and tail is reported as flying over the lower Kennebec. The big fellow seems to have his home in Arrowsic.—Boston Globe.

Best Milk for Babies.

Morning milk is best for babies—fresher and fewer germs than the previous night's milk, but slightly weaker in cream.

Mr. Eli Underwood
list.

Burly Frye is very
on Nellie Route 2, with

Mr. Emmett Frye o
visiting his parents
Standen Frye.

Farmers are busy

Mr. James Hughes
sale Oct. 4, and he
Wisconsin to make his

FELT THE HOME

Peculiar Piece of Valu
Excited the Envy
Editor.

Coshocton Daily Tribune

Coshocton, Ohio

9-24-1909

noospaper and a bill to a man that's dead. It's your affair, not mine.

"Well," said the editor finally, per-
iving that he must be a loser, "in
re, madam, I will cause an extra
to be printed on asbestos to in-
that your husband receives his
on regularly."

Flight of Monster Eagle Noted.

A monster eagle with white head
d tail is reported as flying over the
wer Kennebec. The big fellow seems
have his home in Arrowsic.—Boston Globe.

Old Soldier Suicides.

Washington, Oct. 6.—Wandering to a lonely spot in a wood within the grounds of the government hospital for the insane here, William Ohle, 63 veteran soldier and an inmate of the institution, committed suicide by hanging himself.

Pioneer Oil Man Dead.

New York, Oct. 6.—Samuel Q Brown, one of the pioneer oil men of the United States, is dead at his home here of diseases incidental to old age He was 74 years old.

The Season

Red and Black Top Jockey Boots
American Boy Elk Skin for
Tan Lace and Dull High Cut But
Cocoa Brown High Cut Lace fc

SEE OUR WINDOWS

WALKER & LAW

We carry the largest line of High Cut

Shows Thursday

Coshocton Daily Tribune

Coshocton, Ohio

10-6-1909

e various organizations of
lubs, societies, etc., and
is daily receiving petitions
ers strongly protesting
e imprisonment of the wo-
me of these letters are
n terms of much indigna-
what the writers term "an
a "travesty on justice" and
h to the manhood of the

man was indicted for bur-
evidence showing that she
n into a house and stolen
s and a few other articles
o keep herself and a dis-
her from starvation. It is
hat the value of the arti-
the extenuating circum-
d not warrant the disgrace
hment imposed.

ary Year in Assessments.

pletion of the assessments

in a largely increased acreage of cane next year. He is also shipping smaller lots to California and Michigan.

Hunter Kills Big Eagle.

Sim Moree, who lives about ten miles north of Columbia has added another valuable trophy to his collection of game. This time it is a monster eagle, one of the largest ever seen in this State, and the first one killed in this section for several years. The eagle measures six feet five inches from wing tip to tip and has a claw eight inches across, while his leg, between the knee and claw, measures one inch in diameter. Some time ago Mr. Moree, with others, cleaned out a den of wolves in that section. There were several wolves in the pack, and they had been killing chickens, small stock and other animals.

Will Cash Pension Warrants.

disguises.

But "capuchon" is the term by which we will know it.

It is the same which the powdered beauty of the Bath chair was wont to wear.

In nearly all cases it has a loop-like frame which will allow the display of the hair ornament.

It is always very roomy in the back, so as to accommodate the largest of English buns and Grecian curls.

The plainest of the "capuchons" are made of lace or chiffon, caught up with a cluster of roses or held in place with a bow of ribbon.

But many of the most beautiful of these hoods are of taffeta bewitchingly arranged around the face with shirrings and ruchings.

At any rate, the girl or matron who wants to be effective will not disregard the opportunity afforded by this glorified evening sunbonnet which hails from Paris.—Pittsburg Dispatch

—Things—
to Wear.

The days of the black and white hat are numbered.

The scarab again has a prominent place in jewelry.

The wired net bow as a hat trimming is revived again.

Lynx is very scarce and is generally replaced by black fox.

Picture effects abound in outer coverings for handsome toilets.

The new greens are the most vivid that fashion has ever known.

Newest skirts show a combination of the popular princess panel and the new fashionable pleats.

Jet embroideries are used as a trimming on pale-colored satin as well as on all black foundations.

Among the colors that will be much worn are the blues, pink, brown

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Laurel Ledger

Laurel, Mississippi

12.2-1909

Mrs. Heinz claimed that Officer Pfeffer choked her when she remonstrated with him for arresting her boy.

The court room was crowded all day with a curious throng of anxious people who were interested in the case. Twenty-three witnesses were examined. The testimony throughout was rather interesting.

Officer Pfeffer denied that he choked Mrs. Heinz. He testified that he was arresting her boy for fighting and she interfered and tried to prevent him from doing his duty. He pushed her aside, he said, but didn't harm her.

Mrs. Heinz testified that the officer choked and abused her.

Attorney Kintzinger appeared for the defendant and told the court a policeman's duties and rights.

Officer Pfeffer was suspended from duty by Mayor Berg when the charges were preferred against him. The mayor decided to abide by the decision of the court in dealing with the officer and since Squire Kessler decided in favor of the officers the latter will be reinstated.

Justice Kessler was very patient and gave both sides full opportunity to produce their evidence. Mrs. Heinz and her family swore positively to the charge, but neighbors and others who witnessed the affair did not substantiate her. Several who saw the whole affair testified that Mrs. Heinz hung on to her boy and that the officer only pushed her away. The physician testified there was a red mark on her throat and that he found her very nervous. Witnesses testified she was subject to fainting fits that left her nervous. Dr. Holland examined Mrs. Heinz and testified he found no marks of violence on her. Justice Kessler, after hearing all the testimony, decided the prosecutor had failed to prove her charges and he dismissed the case. This is considered a vindication of the officer.

FIGHT WITH AN EAGLE

George Perry Has an Exciting Experience on Beaver Island.

Clinton Herald: Saturday evening George Perry, a fisherman, who resides on Beaver island, was exhibiting on the streets here a monster eagle, which he had shot on the island in the afternoon.

Mr. Perry stated to a Herald reporter that he succeeded in killing the bird after a hard and exciting fight. He said he first noticed the eagle in the tops of some trees near his house. The bird was looking eagerly at some fat poultry in his yard. He took down his double barrel shot gun, slipped out of the house and fired at the eagle, slightly wounding it. Before the smoke had cleared away, the bird was upon him beating a lively tatoo with its wings and scratching him with its long talons and striking him with its beak. It was some time before Mr. ePrry could recover from the unexpected *and vicious assault of the 'eagle and* he was considerably scratched and bruised before he succeeded in dispatching the bird with the contents of the other barrel.

The eagle is what is called the American brown eagle. It measured six feet and a half from tip to tip, and weighed about thirty-five pounds. Its talons were two inches in length and between the knee and foot, the legs were an inch in diameter.

It is supposed that the bird was *driven here by the severe storm of Friday night.*

J. B. Sampley of the Postal Telegraph company, in discussing Mr. Perry's fight with the eagle, said he had some kind of an idea of the nature of the contest by a similar experience he had in Kansas a few years ago. He was attending school at Wichita and occasionally went out hunting. He had a sister living in the country and one day started out with a new gun he had just purchased in quest of game. He had not proceeded far until he espied a Rocky Mountain eagle perched on the side of a stray stack. He made a detour *of the stack and was close to the* bird before discovered. He fired at the eagle and broke one of its wings. The bird immediately attacked Mr. Sampley and he says the fight was one of the most interesting encounters he ever witnessed. The bird would strike him with its ponderous wings and claw him with its long and sharp talons. At first he tried to strangle the eagle by catching hold of its throat, but the bird skillfully avoided his rushes. Mr. Sampley, seeing that he was getting by far the worst of the fight, commenced striking at the eagle with his gun stock. He soon broke the gun to pieces, but disabled the eagle *and marched triumphantly* home with it. Mr. Sampley said the bird stood about four feet high and weighed nearly fifty pounds. He carried it half a mile and was compelled to rest frequently. This goes to prove how dangerous a combatant one of these eagles are.

To try to get along without Welsbach lights is like trying to get along without railroads.

The person who does not use Welsbachs because somebody told him they were expensive, ought not to believe the world is round because the ancients said it was flat.

It is the cheapest means of illumination you can get—for your store, the hall, or the dwelling.

Cheaper than electricity besides giving four times the light.

We can instal Welsbachs anywhere and will give you estimates at any time.

KEY CITY GAS CO.,
609 Main Street.

WEST VIRGINIA

Republican Convention to Nominate State Officers.

Charleston, W. V., July 10.—There are many leaders and delegates here for the republican state convention which convenes in this city tomorrow afternoon. Hon. A. B. White, of Parkersburg, seems to have no opposition for the nomination for governor. Senator Elkins, who is to be the temporary chairman of the convention arrived today and conferred with many candiates for members of the legislature. The legislature that *is selected this year elects* the successor of Elkins in the senate. Governor Atkinson, Congressman Freer, and State Treasurer Kendall are candidates for permanent chairman.

OFFICER KILLED

Glencoe, O. T., July 10.—The marshal of Glencoe was killed last night and three desperadoes were mortally wounded in a battle twenty miles east of here. The marshal was endeavoring to arrest the outlaws.

SPECIAL

SHOE OFFERINGS!

We expect to make this week a record-breaker if low prices and serviceable footwear will do it.

Ladies' fine Kid Lace Shoes at $1.50

Six new styles of Ladies' Fine Kid Lace Shoes, Black or Tan, heavy or light soles—
our special price $2.00

Seven new styles of Ladies' Fine

Boys' Knock about school shoes, Black or Tan, good fitters, stylish and honestly made—
for $1.00 and...................$1.50

One lot of Ladies' Kid Oxford Ties, which we want to close out in Black or Tan—a collection of $1.25 and $1.50 Slippers to close out for $1.75 and 75c

Dubuque Daily Herald
Dubuque, Iowa
7-11-1910

OPEN ACCESS Freely available online

PLoS BIOLOGY

Feature

What Is the Hobbit?

Tabitha M. Powledge

Who—or what—is *Homo floresiensis*? The tiny hominid bones, which a joint Australian-Indonesian team unearthed in 2003 on the Indonesian island of Flores, have quickly become as celebrated (and derided) as any find in the tempestuous history of human paleontology. The mystery that shrouds these ancient skeletons, nicknamed hobbits after the diminutive characters in J. R. R. Tolkien's novels, seems to deepen with every study published. Two main camps have emerged, each certain they can settle the question. But many other paleoanthropologists confess they still have no idea.

H. floresiensis Discovered

The discovery team declared their find a new human species, *H. floresiensis*, based primarily on a single near-complete skeleton of one very small individual with a very small brain, known as LB1. Compared to *H. sapiens*, LB1, whose age was estimated from tooth wear at about 30 years, was only one meter tall—about the size of a 4-year-old *H. sapiens* child—with a brain the size of a newborn's. Although there are also fragments of eight other small individuals, they provide no information about brain size, nor is much skeleton preserved. Nonetheless, they possess a combination of features never before seen in human fossils, which makes it credible that a previously unknown population of people smaller than today's pygmies lived on Flores between 90,000 and 12,000 years ago.

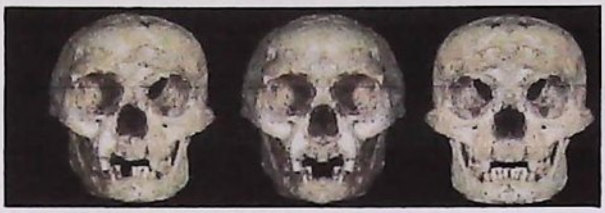
> *H. floresiensis*...could be the first human example of island dwarfing.

Stone tools found at the site raise the possibility that hobbits had culture, even though LB1's brain size would make a chimpanzee sneer. *H. floresiensis*, the discovery team claimed, could be the first human example of island dwarfing. This phenomenon, thought to be evolution's response to limited resources, is known for other mammals, including dwarf elephants from Flores itself. But this is not the only possible conclusion. A long-awaited paper, which appeared online in Proceedings of the National Academies of Sciences of the United States of America (PNAS) on August 23, 2006, offers a radically different interpretation of these skeletal remains.

H. floriensis Disputed

The lead author of the PNAS paper is Teuku Jacob, the "Grand Old Man" of Indonesian paleoanthropology. Jacob was not a member of the discovery team, but his lab at Gadjah Mada University in Yogyakarta on Java is home to many hominid fossils discovered in the region. For reasons still unclear, soon after the journal Nature published the discovery papers in October 2004, the hobbit bones were conveyed to Jacob's lab from the Center for Archaeology in Jakarta, about 450 kilometers away.

The result was an international uproar played out in the media. Australian members of the discovery team were irate because their finds were moved without their permission and were no longer available for study. Other paleontologists expressed alarm at what seemed like one group of scientists making off with finds of another. Jacob said he had been invited to take them.



DOI: 10.1371/journal.pbio.0040440.g001

Figure 1. Three Faces of LB1

The image on the left shows LB1's actual skull. The other two photos are composites made by dividing right and left sides at the midline and mirroring each side to yield two photos displaying obvious differences in right and left side facial architecture.

(Photo left: Etty Indriati. Photos center and right: DW Frayer. Courtesy of Proceedings of the National Academy of Sciences of the United States of America, used with permission.)

Moreover, Jacob pronounced that the bones did not belong to a new hominid species, but were those of *H. sapiens* after all. How to account, then, for the diminutive size of LB1? Jacob concluded that LB1 suffered from microcephaly, a disorder resulting in abnormal development of the brain and, often, body. His diagnosis was backed by Indonesian colleagues and also a few Australian and American researchers whom he permitted to study the bones.

After complex negotiations, most of the bones were returned to Jakarta in February 2005. But the uproar revived when discovery team member Michael Morwood of the University of New England (Armidale, Australia) protested that LB1's pelvis was smashed and another hobbit's jaw was broken and repaired clumsily. Jacob responded that the bones were fine when they left his lab.

When the criticisms of Jacob and his collaborators were finally published in August 2006, they reiterated previous claims that the LB1 skull was unnaturally asymmetrical, showing signs of deformity. The paper also reported that many LB1 traits resemble those of Austromelanesians, and some are similar to Rampasasa pygmies living near the dig site at Liang Bua cave. Hobbits are probably related to them, the authors said, and therefore not a new species. Moreover,

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DOI: 10.1371/journal.pbio.0040440

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GRASS GIRLS
) SHOT TO KILL

NG DAUGHTERS OF KEN-
' MOONSHINER ROUT
REVENUE POSSE.

MARSHAL IS KILLED

ged Fifteen and Eighteen,
d in Their Mountain Home,
adly Battle—A Tragedy of
tucky Wild.

Ky.—After a 60-mile ride entucky mountains, now inding a stream swollen by shets, the correspondent g the towering pines about creek the Tackitt sisters, d eighteen, and Fannie, , who recently gave battle of revenue officers, killed ded another and put the ites deputy marshal in o flight.

ade mound in the village round marks the place Charlie Smith, deputy mar- a bullet still embedded in s of his heart. The sisters d with killing him. One or it but they declare they efense of their aged moth- mith had shot and beaten evolver when a raid was eir still in the mountains inty.

nostrils had scented stew in the mountains back of which corn was being into whisky in violation seven pages of govern- tes. Of course it had to The task was assigned to shal J. Matt Potter, one of officers in the south. For he has been in the serv- le Sam, and more than shot off moonshiners who n. He picked Levi Small- Charlie Smith for such ort and physical participa- occasions might require.

pt up the gulch and came ntainside clearing at mid- e the Tackitts knew what ling the son of the family handcuffed and placed on easy captive. This was ginning of the fight.

orge Tackitt, head of the away from home. This

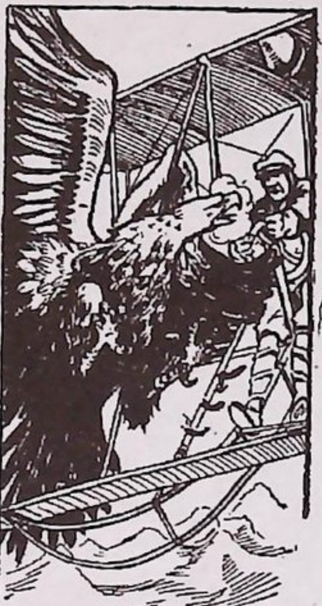
AVIATOR IS ATTACKED BY A FURIOUS EAGLE

M. GILBERT SHOOTS BIRD THAT
REPEATEDLY SWOOPS DOWN
ON THROBBING MACHINE.

Alsasqua, Spain.—Aviator Gilbert, after a battle with an eagle, at a height of four thousand feet, landed here second in the Paris-Madrid race for $20,000.

In his flight over the Cantabrian mountains, while soaring at a lofty height, a monster gray eagle attacked Gilbert, swooping down on the aeroplane and beating the aviator with beak and talons.

Gilbert's aeroplane required all his attention because of treacherous air currents over the mountains. The machine was at a height of 4,000 feet, with the country lying dim beneath. The great bird circled round and round the aeroplane, evidently thinking it a new and monster member of the bird family. Finally Gilbert managed to draw his revolver and fired two shots at the eagle, driving it off. When the aviator landed here he declared the aerial battle with the giant bird had given him the most exciting moments of his career.



Eagle Attacks Aviator.

At one time the eagle attacked him so fiercely, he said, that the aviator had to take his hands off the levers and momentarily lost control of the machine. It was at this time that the intrepid airman drew his revolver. The first shot went wild, but frightened the bird, and the second struck it. Gilbert regained control of his machine just in time to keep it from crashing to the ground.

NAILS TALKING GIRL TO CHAIR

Unusual Kind of Assault and Battery
Charged Against New
Jersey Man.

New York.—John Eddings, the odd jobs man of Prospect Park borough, N. J., is awaiting trial on a charge of assault and battery, but it is such an

Sheboygan Daily Press
Wisconsin
6-30-1911

Billy Boy

By MAITLAND L. OSBORNE

on the garden steps
vatched Belshazzar's
tq dig out a mole.
Billy would have sec-
r's efforts—but today
have turned his head
parade. The somber
r desolation had set-
ind life, which once
ir, mocked him with

in love, and his love
nted, derided and re-
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had struck deep into
ten off, and the barbs

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e flirtations with his
rgarten teacher, and
fairy with the flaxen
him generous kisses
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of his tenth birthday
party—such a party!
she appeared, pink-
dimpled, demure,
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o convince one's self
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advent Billy beheld
ideas of femininity
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dance with the other
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is reluctant steps
ed, "and I'm afraid
would not like to
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evening."
name!
's devotion on his
passed him on the
noon, seated in the
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sed.
sauntered casually
later in the day and
d the snub-nosed one
of the coach house
mercy, but this con-
teous vengeance was
punishment for the

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Billy's big uncle Jack,
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ighted pipe despond-
seated himself be-
e steps and watched
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of men was distinctly
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jealousy had like-
soul? With chin in
ed upon the problem

The cause of Uncle
ain to him. Around
constant Bessie re-
nt satellite yclept
r whom Billy had

ual had once patronizingly addressed him as "my little man," and Billy detested him accordingly.

"I'll punch him," reflected Billy aloud, vindictively.

"Who—what?" asked Uncle Jack, startled.

"Mr. Stanhope," explained Billy. "I saw Bessie's aunt out riding with him in his auto."

Uncle Jack stared. Then he laughed.

"Well you are an observant little beggar," he conceded admiringly. "Though that isn't the root of the difficulty, Billy Boy. Mr. Stanhope is merely an accessory after the fact—non particeps criminis, as it were."

This being too deep for Billy's comprehension, he ignored it and opened up a new line of investigation. "What is the matter, then?" he demanded calmly.

"We quarreled," confessed Uncle Jack.

"What about?" Billy's inquisitorial tune was recognized and feared on occasions by all the family.

Uncle Jack shrugged his shoulders. "You can search me," he answered expressively. "I don't know what about. The fact remains that we did quarrel, and now she won't speak to me, so I can't tell her I'm sorry and ask her to make up."

"Are you sorry?" demanded Billy.

"Oh, yes, I'm sorry all right," admitted Uncle Jack with a rueful laugh. "However, that don't mend matters any, so don't bother your curly head about it, Billy Boy. You'll have troubles of your own some day."

Billy thought of the inconstant Bessie and wisely remained silent.

Belshazzar, waking, stretched himself lazily and wandered out of sight around the corner of the house. Billy, absorbed in thought, followed. If Uncle Jack really wanted to make up, surely Bessie's aunt ought to be informed of the fact.

"I'll go tell her," decided Billy sagely.

Behold then presently Billy trudging sturdily up the street with Belshazzar tagging happily at his heels. When he had turned the first corner he spied Bessie's aunt, book in hand, comfortably ensconced in a hammock in the shelter of a tiny summer house. Making their way directly across the lawn, Billy and Belshazzar appeared before her with disconcerting suddenness.

"Why—how do you do, Billy Boy?" said Bessie's aunt a little uncertainly. It was hard to presage what a visit from Billy might portend.

"How do you do?" responded Billy with owl-like gravity; then wrinkling his forehead thoughtfully, he regarded her with unwinking gaze for an appreciable space of time.

"I don't think you're pretty," he stated at last judicially.

Bessie's aunt laughed deliciously.

"To tell the truth, Billy," she admitted confidentially, "I don't think so either."

"But I guess my Uncle Jack does," continued Billy, whereat Bessie's aunt forgot to laugh and blushed instead. "And he don't know what you and him quarreled about," went on Billy gravely, "but he's sorry anyway, and it wasn't about Mr. Stanhope, because he says Mr. Stanhope is a non—non—something that I forget, but if I was Uncle Jack I'd punch him," said

BLUE GRASS GIRLS WHO SHOT TO KILL

TWO YOUNG DAUGHTERS OF KENTUCKY MOONSHINER ROUT A REVENUE POSSE.

DEPUTY MARSHAL IS KILLED

Sisters, Aged Fifteen and Eighteen, Surprised in Their Mountain Home, Give Deadly Battle—A Tragedy of the Kentucky Wild.

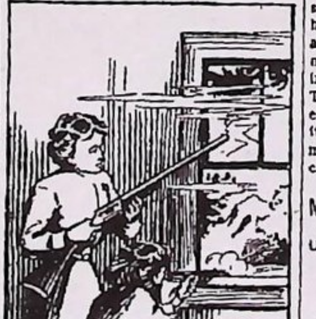
Sergent, Ky.—After a 50-mile ride into the Kentucky mountains, now and then finding a stream swollen by spring freshets, the correspondent found among the towering pines about Long Fork creek the Tackitt sisters, Bettie, aged eighteen, and Fannie, aged fifteen, who recently gave battle to a posse of revenue officers, killed one, wounded another and put the United States deputy marshal in command to flight.

A new-made mound in the village burying ground marks the place where lies Charlie Smith, deputy marshal, with a bullet still embedded in the muscles of his heart. The sisters are charged with killing him. One or both admit it but they declare they fought in defense of their aged mother whom Smith had shot and beaten with his revolver when a raid was made on their still in the mountains of Pike county.

Revenue nostrils had scented stewing mash in the mountains back of Sergent, in which corn was being converted into whisky in violation of at least seven pages of government statutes. Of course it had to be raided. The task was assigned to Deputy Marshal J. Matt Potter, one of the bravest officers in the south. For seven years he has been in the service of Uncle Sam, and more than twice has shot off moonshiners who fired on him. He picked Levi Smallwood and Charlie Smith for such moral support and physical participation as the occasions might require.

They crept up the gulch and came to the mountainside clearing at midday. Before the Tackitts knew what was happening the son of the family was caught, handcuffed and placed on a rock, an easy captive. This was only the beginning of the fight.

Uncle George Tackitt, head of the family, was away from home. This



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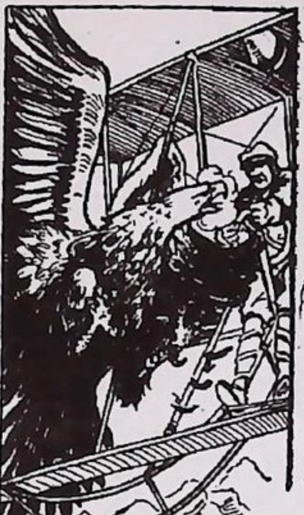
M. GILBERT SHOOTS BIRD THAT REPEATEDLY SWOOPS DOWN ON THROBBING MACHINE.

Alsasqua, Spain.—Aviator Gilbert, after a battle with an eagle at a height of four thousand feet, landed here second in the Paris-Madrid race for $20,000.

In his flight over the Cantabrian mountains, while soaring at a lofty height, a monster gray eagle attacked Gilbert, swooping down on the aeroplane and beating the aviator with beak and talons.

Gilbert's aeroplane required all his attention because of treacherous air currents over the mountains. The ma-



Eagle Attacks Aviator.

chine was at a height of 4,000 feet, with the country lying dim beneath. The great bird circled round and round the aeroplane, evidently thinking it a new and monster member of the bird family. Finally Gilbert managed to draw his revolver and fired two shots at the eagle, driving it off. When the aviator landed here he declared the aerial battle with the giant bird had given him the most exciting moments of his career.

At one time the eagle attacked him so fiercely, he said, that the aviator had to take his hands off the levers and momentarily lost control of the machine. It was at this time that the intrepid airman drew his revolver. The first shot went wild, but frightened the bird, and the second struck it. Gilbert regained control of his machine just in time to keep it from crashing to the ground.

NAILS TALKING GIRL TO CHAIR

Unusual Kind of Assault and Battery Charged Against New Jersey Man.

New York—John Eddings, the odd-jobs man of Prospect Park borough, N. J., is awaiting trial on a charge of assault and battery, but it is such an unusual kind of assault and battery his fame in that section will not be dimmed for many a day. Miss Barbara Pachtold, Eddings' sister-in-law, is only fifteen years old, but she talks

Sheboygan daily Press
Wisconsin 6-30-11

LB1 was microcephalic. The authors proffered specific anatomic details to establish their case. However, even when researchers agree on details of hobbit anatomy, it seems they can't agree on their meaning.

Chinless Wonders

Take the chin. Chins mark a skeleton as *sapiens*; no other hominids have them. Everyone agrees that the two hobbit mandibles lack chins. But the PNAS paper asserts that appearing chinless does not necessarily mean that the hobbits were not *H. sapiens*. The paper included a photo of a live Rampasasa pygmy with what the authors termed a negative chin.

But paleoanthropologist Jeffrey Schwartz from the University of Pittsburgh (Pittsburgh, Pennsylvania, United States) points out that although having a chin signifies our own species, there are individual exceptions, so chinlessness doesn't say much. "Having a chin provides information. Not having a chin doesn't."

...it's pretty much the usual fossil furor...

If chinlessness can't illuminate the discussion, what about teeth? Hobbit teeth are a strong reason to think they may not be a new species. Everyone agrees that compared with other hominids, which have big teeth, hobbit teeth are small, like *sapiens* teeth. Not only are they small, according to paleoanthropologist John Hawks of the University of Wisconsin (Madison, Wisconsin, United States), hobbit teeth are small in the *sapiens* pattern: first molars are biggest and third molars smallest. *H. erectus* and Australopiths have different patterns.

Robert Eckhardt of Pennsylvania State University (State College, Pennsylvania, United States), an author of the PNAS paper, argues that chance convergence of traits in different hominid lineages is unlikely to explain these similarities. Co-author Etty Indriati, colleague of Jacob's at Gadjah Mada, notes that hobbit teeth also share features with Rampasasa pygmy teeth, such as rotation of the premolar, that imply genes in common.

Ralph Holloway, paleoanthropologist at Columbia University (New York, New York, United States), who shares the critics' belief that LB1's brain was pathological, nevertheless was dissatisfied with the PNAS paper. "It's the kind of paper that should be published, but they could have done a better job on it." Hobbits, he says, should have been compared to several populations. Indriati responds that it is sounder scientifically to compare LB1 with Flores pygmies, its closest neighbors in both space and time.

The Meaning of Asymmetry

Holloway agrees that LB1's cranium is asymmetrical. But he and others also agree with University of New England co-discoverer Peter Brown that asymmetry could result from being under several meters of deposits for several thousand years, plus the difficulties of recovering and reconstructing bones described originally as like wet blotting paper. Hobbit bones were never fossilized. "To use that asymmetry to make a case for pathology, you know, I don't think that's a very strong argument," Holloway says.

The PNAS authors reinforced the case for asymmetry with striking composite photographs of LB1's face (see the Figure). They divided right and left sides at the midline and mirrored each side to yield two photos displaying obvious differences in right and left side facial architecture. A "heuristic device to emphasize the left-right differences," according to Eckhardt. However, says paleoanthropological craniofacial specialist Todd Rae of Durham University in the United Kingdom, "You can know if it's markedly asymmetrical only by comparing it statistically to other specimens that have also undergone the process of burial and recovery—i.e., other fossils."

The Hobbit's Brain

A March 2005 paper in the journal Science, whose authors include a subset of the discovery team, reported that a virtual endocast of LB1's cranium, which has brain features imprinted on it, suggested that hobbits were not simply miniature versions of *sapiens* or *erectus*, but still may have had human-like thinking abilities because the prefrontal cortex and temporal lobes seemed expanded. The region, known as Brodmann area 10, is thought to be the seat of higher cognitive processes like memory, communication, and planning.

By contrast, Holloway, who has also studied an LB1 endocast, says the brain's small size and some other features hint at pathology. Parts of area 10 called the gyri recti seem too thin, he reports, and he has never seen a human endocast so flattened out before, which also suggests abnormality. Like several other researchers, Holloway has tried (and failed) to find direct correspondences between LB1's cranium and those of people with microcephaly. Microcephaly, meaning simply small head, is an umbrella term for a miscellany of conditions with scores of different genetic and environmental causes and myriad manifestations. The most recent study, published online in Anatomical Record on October 9, 2006, concludes that "it is not possible to match any of these syndromes exactly with the LB1 fossil," although the authors argue that some microcephalic syndromes share features with LB1, including stature, head size, and anomalies of jaw and teeth. As all the studies point out, nothing so far unearthed in the clinical literature or the fossil record matches LB1's peculiar head. Those negatives, of course, don't rule out deformity, especially deformity unique to the hobbits; isolated populations routinely develop distinctive abnormalities.

Debbie Argue of Australian National University (Canberra, Australia) and co-authors of an October 2006 paper in the Journal of Human Evolution say LB1 is probably not microcephalic, and they endorse the designation of a new species. They also say the hobbits are not pygmy-like. They suggest instead (as have others) that, whereas LB1's cranium is not like anything else in the hominid fossil record, some other hobbit bones resemble much older early human (but non-*Homo*) fossils known only from Africa—the Australopithecines.

A Very Ancient Mariner?

The original Nature paper had speculated that hobbits might have been a dwarfed descendant of *H. erectus*. *H. erectus* was near our size, huge compared with tiny LB1, and members of the discovery team have backed away from that notion. Argue and colleagues concur that *H. erectus* is an unlikely ancestor common sewing needle of medium size, an inch and five-eighths in length, and drilled a hole through its entire length from eye to point.

BIBLES

The most handsome line of bibles in Indiana can be seen at our store. Bibles to suit everyone—with the large bold print that is easy on the eye.

Bibles for the older folks.
Bibles for the teacher.
Bibles for the young folks.
All moderately priced.

Testaments with extra large print suitable for church service. Smaller testaments as well as the pocket edition.

See our line of bibles.

Copyright by Harris & Ewing.

CHARLES L. MAGEE.

On Dec. 1 Red Cross Christmas stamps will be placed on sale in all the cities of the country. Charles L. Magee, secretary of the American society, made this announcement at Washington.

AFTER LONG ILLNESS

Mrs. Schwartz Was Very Weak—Vinol Made Her Strong.

When we tell you that Vinol is the best remedy in all our stock for making weak people strong and vigorous, we are only telling you what has been proved hundreds of times.

For instance, Mrs Y. F. Schwartz

the decree embodies "substantially all" of the requests made by the government.

Mr. Wickersham opposes the objection of the independents to the size of the distributed companies with the statement that the public would benefit more by competition of large well organized companies in strong hands than from destructive competition between a great number of weak organizations.

Asphyxia Caused Fall, Says Rodgers.

Pasadena, Cal., Nov. 17.—"Etherial asphyxia" is what caused C. P. Rodgers' fall just as he was completing his coast-to-coast flight, he says, and is responsible for the death of many aviators.

7.252,963 in Greater London.

London, Nov. 17—Greater London has a population of 7.252.963 and covers an area of 693 square miles, according to statistics published by the county council.

men were isolated in the Philadelphia hospital and their homes were quarantined.

EAGLE ATTACKS HUNTERS

Lively Combat Before Giant Bird Is Killed.

Altoona, Pa., Nov. 17.—Wilbur Lantz and Charles Mason while hunting in the Allegheny mountains had a lively battle with a big eagle. Mason wounded the eagle and Lantz shot the bird.

Angered it swooped down at them. They clubbed the bird but failed to kill it. The bird bit Mason's foot through his boot. Lantz was severely scratched on the hands by its claws. The eagle measured fifty-two inches spread.

CHLOROFORM ENDS HER LIFE.

Dr. Kirk, Woman Physician of Pittsburg, Kills Herself.

Pittsburg, Nov. 17

Indiana
Evening Gazette
PA 11-17-1911

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centage of the revenue derived from the sale will be spent in the interest of the work in Coshocton. The Federation has also pledged itself to assist in furthering the educational phase of work that has accomplished so much in the anti-tuberculosis crusade. A tuberculosis committee was appointed to be in charge of the details of work to be undertaken locally. This committee included, Mrs. F. E. Pomerene, Miss Tillie Laurie, Mrs. Carl R. Herbig, Mrs. L. P. Gallagher and Miss Emma Manner.

Early Xmas Shopping

The City Federation also pledged itself yesterday at the meeting of the executive board to do all in its power toward securing a sane Christmas for Coshocton.

(Continued On Page Six.)

Delightful Concert by Glee Club

Nimrods Find Game Plentiful

HUNTING SEASON OPENED WITHOUT SINGLE ACCIDENT.

The fields and woods of this section were fairly alive with nimrods who tok advantage of the opening of the hunting season Friday. While everybody seemed to be satisfied with the amount of game to be found, fortunately not a single accident was reported. Rabbits are reported unusually plentiful but quail very scarce.

Rabbits for Supper

Enough rabbits to feed the crowd expected to attend the

a supreme court case. With the exception of one witness, the defense completed its case late yesterday, and Van Epp began the state's rebuttal.

The case is expected to go to the jury Monday.

Worries While Waiting

"But it's a long time to wait," said the white-haired prisoner today. "Whatever's coming has got to come, and I wish it was over."

Chris hobbled into the courtroom for the afternoon session Thursday with his pockets bulging full of big red apples.

"They're from my farm," he said proudly. He insisted on giving them all away to friends.

"It's so noisy in here, ain't it?" he whispered, during a recess. He looked around at the crowd standing six deep at the rear of the room. "You know they're talking all the time about me. I can hear 'em."

Many Women Attend

Three-fourths of the spectators on the six days of Stener's trial have been women.

Stener's case will go to the jury with two main lines of defense, that someone other than Stener may have committed the crime, and that Stener, if he did commit

Monster Eagle Caught in Trap in White Eyes tp.

A big golden eagle caught in a trap on the Everett Boyd farm in White Eyes township is attracting a crowd of interested spectators. The eagle weighs twelve pounds and measures six feet from tip to tip of its wings.

A turkey had been killed on the Boyd farm and Mr. Boyd set the trap in an effort to find what had caused the loss of the Thanksgiving bird—he found his answer Thursday afternoon when the eagle was seen struggling to free himself from the trap. The eagle's mate has also been seen in the vicinity. The bird now in custody at the Boyd farm was uninjured as it was held in the trap by its claws only.

Generally Overlooked

It is understood that this feature of the law has been overlooked generally in other counties of the state and while it is only technical, yet the violation may prove an opening for anyone who cares to at least cause some inconvenience to successful candidates. Still should the matter be brought to a test, it is thought that the law would allow a man to correct the oversight in his expense account, as filed with the board. The law provides that five citizens may institute proceedings against a violator of the corrupt practices law and certificates of election may be withheld until the election board is satisfied that all provisions of the law have been compiled with.

Check Stubs Will Do

The expense account of the Democratic committee, filed last night, while it was accompanied by no vouchers, had the stubs of checks, by which practically all bills were paid and which it is thought will answer the purpose.

Hermit Pays

Coshocton Morning Tribune
Coshocton, ohio
11-16-1912

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Muldoon was beating the table with his club and crying:

"Order! order! order!"

"To hell with order!" bawled some one from the First ward delegation.

"On this ballot," Muldoon was calling, "there were sixty-nine votes cast; necessary to a choice, thirty-five. James P. Conway has received forty votes; John W. Underwood, twenty-nine, and George W. Simmons"—he paused, as if to decipher the vote—"none. James R. Conway, having received the necessary number of votes, is therefore declared the nominee of this convention."

Underwood was stunned. He staggered through the horrible uproar toward the door. He longed for the air outside, even the heavy air of lower Clark street, where the people surged along under the wild, dazzling lights, in two opposite, ever-passing processions. His head reeled. He lost the sense of things, the voices about him seemed far away and vague, he felt himself detached, as it were, from all

[illegible] merling appeared at a window in her home, and then tried to make love to her, paid a fine of $5 and costs before Municipal Judge Sabath at the Shakespeare avenue court the other day. He made no denial of the girl's charges and informed the judge that he has since married another young woman.

Wadjinski lives at 2969 North Ridgeway avenue and Miss Emmerling lives at 2970 North Ridgeway avenue. While Wadjinski was perched in the tree and the girl was ordering him to climb down, Mrs. Anna Emmerling, her mother, called the police. When Wadjinski descended he found himself under arrest.

"I knew he was going to marry another girl and I didn't want his attentions," Miss Emmerling testified.

"It's all done with now, judge," said Wadjinski frankly. "It happened, all right, but I married another girl. I tore my clothes climbing the tree."

"Five dollars and costs," said the

[illegible] between them was the snake.

GIANT EAGLE ATTACKS WOMAN

Bird Measuring Nine Feet From Tip to Tip Is Finally Killed by Georgian.

Moultrie, Ga.—Mrs. C. W. Hall, who lives near here, was attacked by a monster eagle the other morning.

Finding the huge bird attacking a pig, she tried to drive it away, when the eagle turned on her.

The woman was badly scratched and beaten by the bird's wings. Her husband hurried to his wife's relief. The eagle, still defiant, attacked Mr. Hall and was killed with a fence rail.

It measured from tip to tip nine feet, and is the largest ever killed in this section.

Cow Has Litter of Calves.

Powell Park, Colo.—A cow belong-

Grand Rapids Tribune
Grand Rapids
Wisconsin
8-27-1913

ᴾELOQUIN, Box 116, Sterling, Conn.

Massena, N. Y.—"I have taken Ly-
ia E. Pinkham's Vegetable Compound
nd I highly recommend it. If anyone
ants to write to me I will gladly tell
er about my case. I was certainly in
bad condition as my blood was all turn-
g to water. I had pimples on my face
nd a bad color, and for five years I had
een troubled with suppression. The
octors called it 'Anemia and Exhaus-
ion,' and said I was all run down, but
ydia E. Pinkham's Vegetable Com-
ound brought me out all right."—Miss
AVISA MYRES, Box 74, Massena, N.Y.

Young Girls, Heed This Advice.

Girls who are troubled with painful or
egular periods, backache, headache,
ragging-down sensations, fainting
pells or indigestion, should immediately
eek restoration to health by taking Ly-
ia E. Pinkham's Vegetable Compound.

peal, but a clarion call. When an entire nation is aflame the poet is apt to find his mission rather perfunctory.

Finally Captured' Eagle.

After defying a score of traps and as many guns of farmers, who have sought vainly to impose summary sentence for the loss of hundreds of chickens over a period of six months, Old Baldy, a monster eagle, was caught by a man with a lasso. He lay waiting in the shadow of his chicken house for the chicken thief for more than eight hours. The bird swooped down shortly after daybreak The lasso was thrown around the eagle's neck. The man wanted to capture the bird alive, but it fought so desperately that he was forced to shoot it. The eagle measures eight feet seven inches from tip to tip, and weighs 73 pounds.

Korgodsky dashed on, and when he met a man or woman he esteemed he gave him or her a violent shove and shouted "Help!" On the counter in Korgodsky's store was a small package. It ticked. It was—it was a bomb!

There were fully fifty people fleeing with Isaac now. They descended upon the Maxwell street police station. The Maxwell street police sergeant is used to many things. If a pink Philooloolu bird should enter the Maxwell street police station and say, "A regiment of Somali troopers is about to advance upon Isaac Korgodsky's dry goods store," the sergeant would reach for his pencil and make a note of it.

So when Isaac himself appeared with his procession of wildly excited relatives and friends the sergeant inquired, "What's up?"

"A bomb—a bomb!" said Isaac

Rev. E. Heslop.

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Hints, also music
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Adv.

Stevens Point Daily Journal
Stevens Point, Wisconsin
10-5-1914

Captain Brickey, of Harvard, but lately out of the hospital, is confident his team will smash its way to victory. Betting on the game at the present time finds Harvard a favorite at 10 to 7.

There is plenty of Tiger money in sight and more coming along on every train as the Princeton rooters arrive.

The Harvard players are resting up at the Brooklyn club, where they will remain until tomorrow morning. The Princeton athletes reached Boston today, the backs this morning, and the rest of the squad later in the day, and they will have an easy practice as a method of working off the fatigue of their trip from New Jersey.

The back field men will work out at

RUMOR SULTAN IS A PRISONER

ritory of Alaska and have practical suffrage in the following states: Connecticut, Delaware, Florida, Iowa, Illinois, Kentucky, Michigan, Massachusetts, Minnesota, Mississippi, New Jersey, Nebraska, New Hampshire, North Dakota, Ohio, South Dakota, Vermont and Wisconsin.

After defying a score of traps and guns of farmers of Buckingham, Cal., who vainly sought to capture him for the loss of hundreds of chickens over a period of six months, Old Baldy, a monster eagle, was caught by Harry Radcliffe with a lasso. Radcliffe waited in the shadow of his chicken house for more than eight hours and succeeded in throwing the lasso around the eagle's neck shortly after daybreak. The bird measured eight feet seven inches from tip to tip and weighed seventy-three pounds.

For traffic on Lake Okanogan, British Columbia, the Canadian Pacific railway has launched a steamer 200 feet long and forty feet wide, steam

Fort Wayne News

Fort Wayne, Indiana 11-06-1914

Giant Bird Shot Near Wilkes-Barre Had Tell-Tale Wool In Talons.

A mountain eagle measuring seven and a half feet from tip to tip of its wings and weighing thirty-five pounds, was shot at Hay's Cohners, about twelve miles from Wilkes-Barre, Pa., by Ollie Hay.

When brought down it had lamb's wool in its talons, and the raisers in the section are now looking for its nest to verify the theory that it carried off several of the small lambs of their flocks.

The farmers say that the eagle was powerful enough to carry off a three-year-old child. It is the first eagle ever shot in the region, according to farmers who have lived in the vicinity all their lives.

ceased—Letters testamentary on said estate having been granted to the undersigned all persons indebted thereto are requested to make immediate payment, and those having claims or demands against the same, will present them without delay for settlement to the undersigned residing in Oxford township.

CLEMENT LINGG, Executor.
Route 3, New Oxford, Pa.

HEALTH A FACTOR IN SUCCESS—The largest factor contributing to a man's success is undoubtedly health. It has been observed that a man is seldom sick when his bowles are regular—he is never well when they are constipated. For constipation you will find nothing quite so good as Chamberlain's Tablets They not only move the bowels but improve the appetite ond strengthen the digestion. They are sold by all dealers.

Yon never can tell. Even a man who wants the earth objects to having mud thrown at them.

day of April, 1915. R. M. STRALEY, J. P.
Correct—Attest:
JOHN N. HERSH,
W. H. STOOK,
J. M'LAIN GILBERT, } Directors

OLD DR. THEEL'S OFFICE INC. 1719 SPRING GARDEN ST., Phila. 50 yrs practice. My German Treatment the best, has no equal; better than all latest discoveries, beats the World & "606" in curing Blood Poison; only one that has no after-effects. Sufferers from Special (new cases in 4-10 days); all Chronic, Weakness, Errors Losses, Drains, Kidney, Bladder etc., "GERMAN TREATMENT" first, can not be duplicated. The positive restorer of Lost Manly Vigor, quick & sure. Sworn Testimonials & new Book free! A revelation to all special suffering YOUNG & OLD, YOUTH, MEN & WOMEN. Hours: 9-4, 6-8, Sun. 9-2. After all others fail—the "German Treatment" cures. I GOT CURED! Ad. Schatzer says under oath: OLD DR. THEEL'S German Treatment cured me & wife, after the use of mercurial drugs & latest 606-injection treatment that nearly killed us. A total wreck uncle Fred took us to Dr. Theel who cured him from the worst kind of Specific Blood Poison, General Weakness & Losses 22 years ago. Sufferers from Special & Chronic ailments, Drains, Lost Vigor, Broken down & Unhappiness & if robbed & fleeced, like I was, send for Old Dr. Theel's new book free. A revelation to special suffering Men & Women

If you want the news while it is new subscribe for the ITEM.

News and
any other
price is *Onl*

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ces at Item office. Hand in

New Oxford Item
PA
5-13-1915

Giant Bird Shot Near Wilkes-Barre Had Tell-Tale Wool In Talons.

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CLEMENT LINGG, Exec

Route 3. New Oxford. Pa.

Health a Factor In Success—The l
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is undonbtedly health. It has been
served that a man is seldom sick w
his bowles are regular—he is never
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move the bowels but improve the a
tite ond strengthen the digestion. T
are sold by all dealers.

Yon never can tell. Even a man
wants the earth objects to having
thrown at them.

New Oxford item
Penn. 5-13-1915

Powder POWDER

rity Bank *Eleventh and Broadway*

AVINGS AND COMMERCIAL

SURPLUS $487,000.00

Note the Growth of this Bank:

ARY 1, 1914....................$1.799.584.11
1, 1914....................$1,982,225.79
31, 1914....................$2.113.545.26
MBER 1, 1914....................$2.248.824.50

(Signed) HOUDINI.

◆

MAN ATTACKED BY EAGLE.

MONTEREY, Tenn., Nov. 20.—Victorious in a battle with a large gray eagle, J. G. Stephens, a teacher at the Meadow Creek school, a few miles west of town, had an experience unique among Tennesseans. Stephens was returning home from school and passing through some dense woods when the giant bird sprang from a log beside the roadway and with wings outstretched and a hissing shriek attacked him. Dropping a dinner pail, Stephens picked up a stone and succeeded in hitting the eagle with his first blow. Then seizing a club he soon killed the bird. The eagle measured 4 feet 6 inches from tip to tip of its wings.

◆

GOT HIS GOAT: ATE IT, TOO.

NEW YORK, Nov. 20.—Rocco Penna, who lives in the Bronx, was having his goat cooked in a near-by

robbed Graves' store and shot him, inflicting a scalp wound, when he cried out for help as the hold-ups were leaving.

Alverez, John Gunther, convicted of a holdup, and Edward Harrison, confessed burglar, were taken to San Quentin prison this morning. Gunther is given three years and Harrison one.

◆

TWO BODIES RECOVERED.

SEATTLE, Nov. 20.—The bodies of two miners were recovered from the wrecked Ravensdale mine of the Northwestern Improvement Company today, bringing the number found to seventeen and leaving fourteen still in the mine.

◆

DR. DUMA NOT ENNOBLED.

VIENNA, Nov. 20.—Dr. Constantin Theodor Dumba, former Austrian ambassador to the United States, who arrived here three weeks ago.

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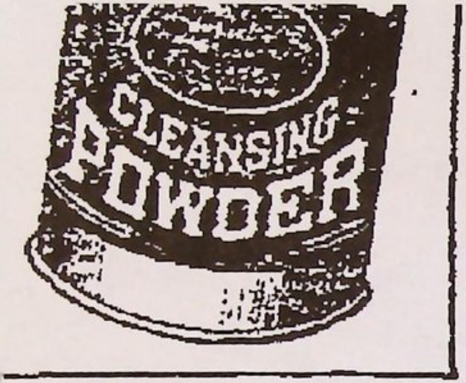
Oakland Tribune

California

11-20-1915



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Orpheum audience on next Monday night.

"Again thanking you for your courtesy in the matter, I am

"Yours very truly,
(Signed) "HOUDINI."

MAN ATTACKED BY EAGLE.

MONTEREY, Tenn., Nov. 20.—Victorious in a battle with a large gray eagle, J. G. Stephens, a teacher at the Meadow Creek school, a few miles west of town, had an experience unique among Tennesseans. Stephens was returning home from school and passing through some dense woods when the giant bird sprang from a log beside the roadway and with wings outstretched and a hissing shriek attacked him. Dropping a dinner pail, Stephens picked up a stone and succeeded in hitting the eagle with his first blow. Then seizing a club he soon killed the bird. The eagle measured 4 feet 6 inches from tip to tip of its wings.

GOT HIS GOAT; ATE IT, TOO.

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Oakland Tribune
California 11.20.1915

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which the world is experiencing today."

Doctors and scientific men, however, explain that the self-killings are but the acts which result from a diseased mind. Professor L. L. Thurstone of the University of Chicago psychology department, thinks at least some of the causes for student suicides are found in the public attitude toward mental sufferers.

"Mental illness should not be a

How Doctors Treat Colds and Flu

To break up a cold overnight or to

become evident enough to bring spontaneous retorts from scientists.

GIANT EAGLE ROPED BY MEXICAN SHEPHERD

SAN ANGELO, Texas, Feb. 4.—Jose Villalobo, 35-year-old Mexican sheepherder, recently roped an eagle perched in a tree. Men have roped deer and bear but never before an eagle, at least not within the memory of the oldest old-timers. The eagle was brought to town and placed on display in a window—the only live eagle seen here in years.

The eagle, an American bald, measured 9 feet from wing to wing.

exchange which will der
benefits and improvements with
other local exchanges in the state,
said.

ABOUT BABIES

LONDON, Feb 4.—The birth r
for the laboring classes of Great B
ain, announced recently, is 231 bir
for every 1,000 laborers. In the m
ical profession the births were re
puted as 103 for every 1,000; 105
1,000 for ministers.

Girls Have Used G.F.P. For 50 Year

Port Arthur News

Texas 2-4-1927

Paris, Aug. 11—(AP)—Myron T. Herrick, American ambassador in Paris, has directed the attention of the French foreign office to the "absurdity and impropriety" of a story published yesterday afternoon by the newspaper La Presse declaring that H. M. Blackmer, American oil operator, is being pursued in France because Secretary Kellogg and President Coolidge want "secret documents of high political importance."

The newspaper said that efforts to extradite Blackmer on a perjury charge in connection with his income tax returns, were a mere blind and that four American secret service men have been seeking to arrest Blackmer on French soil contrary to all law and precedent

EIGHT INJURED WHEN BLAST FOLLOWS FIRE

Chicago, Aug. 11—(AP)—Eight persons were burned or injured one of

Huge Eagle Attempts To Carry Off Child

Lubec, Maine, Aug. 11—(AP)—An immense eagle swooped down into the ward at the farm of Guy Lyons near here yesterday, seized 2 year old Buddy Lyons in its talons and sought to carry him away.

Buddy's 5 year old brother grasped the child's ankles and after a tussle pulled him free.

The bird which had a wing spread of seven feet soared to a nearby tree and remained there all day. It was the first time that an eagle had been known to attempt to carry off a child in this territory, although the birds, protected by federal law, have raided poultry yards.

[illegible]

REGISTERED TODA

Boards to be in Session i
Each Precinct Until
8 O'clock.

Many voters in the city had b noon today availed themselves o the opportunity to register at th polling places in the 11 precinct of the city, where the boards o registration went into session at o'clock this morning.

The places of registration will b open this evening until 8 o'cloc for the convenience of voters who d not have the time to register durin the day. It was expected that large number would take advantag of the opportunity.

This morning 3,000 voters ha

Ironwood Daily Globe

Ironwood, Michigan

8.11.1928

controversy. Arequipa was charged with attempting to form a dictatorship.

CHICAGOAN ROBBED

(By United Press)

CHICAGO, March 10—Two men held up Edward Geitz, vice president of the National Brokerage company, Tuesday, in the vestibule of his home and robbed him of a 900 diamond ring and $100 in cash

RADIOLOGIST DIES

(By United Press)

LONDON, March 10—Prof Mar-in Haudek, famous Roentgen radiologist of Vienna university, died ddenly Tuesday of heart disease, n Exchange telegraph dispatch rom Vienna said. He was 51.

GIANT EAGLE SEEN NEAR STONINGTON

(Special to The Herald)

STONINGTON, March 10—An eagle with a wingspread estimated at seven feet, has been seen frequently about the Ponting farm three miles west of here in the past few days. The bird, according to Tom Ponting, appears to be unafraid of humans and has sat idly in a tree while a man rode horseback underneath No effort will be made to shoot or capture the bird, it was said.

"The testimony of Dr Harger (a defense witness) will always remain in my mind He testified that Arlene was not poisoned There has been no evidence that she was drunk because she wasn't She was knocked unconscious on the porch of the Thompson home, then taken to an automobile and ravished

Prohibition Not Issue

"Prohibition is not an issue Drunkenness doesn't excuse this crime.

"Gentlemen, the hearts of mothers over the nation are anxiously awaiting your decision. They are waiting to see if you will put a tamp of approval on this defendant's act."

Decatur Herald

Illinois

3-10-1931

Eagle Attacks Dog in Yard of Owner at Tahoe

TAHOE CITY, Cal., Apr 9—(Special)—Ed Wagner of Lake Forest tells of a monster eagle which he says, swooped into his front yard one day this week to attack his dog Wagner describes the eagle as having an eight foot wing spread and claws as large as a man's hands He says that when the creature was deprived of its prey it angrily swooped so close to his head that he could feel the swish of its wings Wagner immediately warned *his* neighbors in case their small children might be imperiled by the great bird, and he declares he is keeping his rifle in readiness against its possible return

A bird of somewhat the same description was seen to attack a large cat in the Lake Forest *vicinity a few* months ago, and two eagles were killed near there last fall It is feared there may be a colony of them nesting somewhere in that locality

and then I noticed I didn't feel the pain while I looked at the lightning.

"But it's awful hard to forget about this pain that keep running through my legs"

Two dark scars on his left foot are a reminder of the horse accident

Bryan has a soft, throaty voice with a baritone quality

The Untiedt home is modest It is a green-painted house on a 160-acre farm They raise mostly corn and they burn corn cobs to ease the fuel bill. They have five horses, including two ponies for the youngsters, and six cows

The living room presented a picture of rural life Besides the couch on which Bryan rested, there were in the room a brass bed, a few chairs, a small table upon which potted geraniums stood by one of the two windows A big wooden pail with some other plants stood at the other window.

In one room was a heating stove, and overhead from a stretched clothes line in a triangle shape hung suspended a lot of stockings and other garments.

Hanging from the picture molding near the ceiling in one corner was a battered violin case and beside it a banjo.

"That's a real TLD valuable violin," said Bryan He had Virgil bring it down "It's worth thousands of dollars and was made by Stradivarius"

Sure enough, the name Stradivarius was to be seen inside the violin Four calendars completed the room's decorations.

Reno Evening Gazette

Reno, Nevada

4-9-1931

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URDAY

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expected to be dismissed from the Woodland Clinic tomorrow. Mr. Engh and their daughter, Catherine, also were hurt, but not seriously. An unidentified truck struck the car in which they were riding.

Giant Eagle Killed By Woodland Man

Mark Edgar, local business man, killed a monster eagle in Colusa county late Thursday. The wing spread was six feet 6 inches. He saw the killer bird in a water ditch and did not realize what it was until he had killed it.

He offered to donate the bird to the Boy Scouts for stuffing and mounting.

evening about 6:30 o'clock when the gasoline tank on a tractor exploded, partially damaging the tractor and destroying a large truck that was nearby. The truck was sprayed with flaming gasoline. The accident happened at the G. N. Merritt and Sons ranch just south of Woodland.

Killian Weidner, 31, who was working on the tractor, was severely burned, while Albert Gavillet, who was nearby, suffered minor burns. Both men are in the Woodland clinic for treatment.

Both of Weidner's hands and one leg were badly burned. Gavillet escaped with burns on one hand.

Arm Broken But Didn't Know It

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of the neediest families. Every
ny will be thankfully accepted. Th
is a three-fold need for a sum n
larger than it will be possible to r
through the Charity Football G
Tuesday. The demands natur
treble those of past seasons.

The directors of the Woodlan
Parent-Teachers held a speci
meeting today and unanimous
voted to give $75 toward th
Cheer Fund.

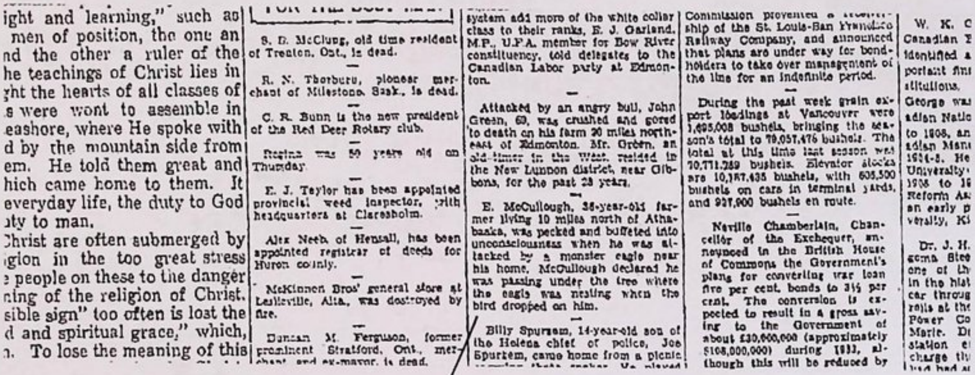
If you care to aid in lightening
burdens of our unfortunates, your
tributions may be mailed to or
with Chester Gruhler or Floyd S
rock, the cashiers of the Relief Bo
or with any member of the board
with the "Democrat".

Today's godsends:

Previously acknowledged $ 9

Woodland Daily Democrat

Woodland, CA 12-4-1931



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S. D. McClung, old time resident of Trenton, Ont., is dead.

R. N. Thorburn, pioneer merchant of Milestone, Sask., is dead.

C. R. Bunn is the new president of the Red Deer Rotary club.

Regina was 50 years old on Thursday.

E. J. Taylor has been appointed provincial weed inspector, with headquarters at Claresholm.

Alex Neeb of Hensall, has been appointed registrar of deeds for Huron county.

McKinnon Bros' general store at Leslieville, Alta., was destroyed by fire.

Duncan M. Ferguson, former prominent Stratford, Ont., merchant and ex-mayor, is dead.

system add more of the white collar class to their ranks, E. J. Garland, M.P., U.F.A. member for Bow River constituency, told delegates to the Canadian Labor party at Edmonton.

Attacked by an angry bull, John Green, 60, was crushed and gored to death on his farm 20 miles northeast of Edmonton. Mr. Green, an old-timer in the West, resided in the New Lunnon district, near Gibbons, for the past 23 years.

E. McCullough, 38-year-old farmer living 10 miles north of Athabaska, was pecked and buffeted into unconsciousness when he was attacked by a monster eagle near his home. McCullough declared he was passing under the tree where the eagle was nesting when the bird dropped on him.

Billy Spurzem, 14-year-old son of the Helena chief of police, Joe Spurzem, came home from a picnic

Commission ship of the St. Louis-San Francisco Railway Company, and announced that plans are under way for bondholders to take over management of the line for an indefinite period.

During the past week grain export loadings at Vancouver were 1,695,008 bushels, bringing the season's total to 79,057,476 bushels. The total at this time last season was 70,771,289 bushels. Elevator stocks are 10,187,435 bushels, with 605,500 bushels on cars in terminal yards, and 937,900 bushels en route.

Neville Chamberlain, Chancellor of the Exchequer, announced in the British House of Commons the Government's plans for converting war loan five per cent. bonds to 3½ per cent. The conversion is expected to result in a gross saving to the Government of about £30,000,000 (approximately $108,000,000) during 1933, although this will be reduced by

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Lethbridge Herald

Lethbridge, Alberta, Canada

7.2.1932

because of differences in cranial shape and limb proportions. William Jungers and Susan Larson of the State University at Stony Brook (New York, United States) have analyzed hobbit postcranial material at recent paleoanthropology meetings. They have found limb proportion convergences with Lucy, the most famous member of *Australopithecus afarensis*. Still, they say, shoulder characteristics more closely match early *H. erectus*.

At least a genetic link to *H. erectus* is not geographically outrageous. *H. erectus* had been in the region for nearly 2 million years; in fact, the type specimen was found more than a century ago on the Indonesian island of Java.

What is a hobbit?

But, unlike big-brained *erectus*, whose brain was 75% of the size of ours, there is no evidence whatever that small-brained Australopiths (35% the size of ours) ever ventured out of Africa—let alone invented boats and sailed off to Indonesia more than 3 million years ago. The Argue et al. paper speculates on ways very early hominids might have migrated to the region. Something like this astounding seagoing scenario—a really, really ancient mariner—seems to be required if *H. floresiensis* had Australopith ancestry.

Hawks speculates that this quandary might go away if we knew more about the environmental and developmental factors that determine human body size. "We have no idea what explains body size, and the hypotheses about this are not compelling."

Maybe LB1's pelvis looks Australopithecine, Hawks suggests, not because the hobbits descend from a seafaring Lucy, but because that's what the pelvis of a very small human biped looks like. "It has the virtue of not depending on external events to explain it," Hawks says. "It's just a consequence of being small. You still have to explain why they're small." If we knew why growing big or small was advantageous, we might learn whether island dwarfing applies to people as well as elephants.

Richard Potts of the Smithsonian Institution (Washington, DC, United States) suggests something similar. What would happen, he wonders, if an early, smaller-brained *erectus* was subjected to island dwarfing? Would ancestral Australopithecine features emerge, perhaps as a result of changes in fetal development? "We'd like to know that, but you know, we just don't."

Were Hobbits Toolmakers?

The debate over the hobbit brain has been fueled by stone tools found at the site. A commentary accompanying the original two papers suggested that some were like tools associated elsewhere with modern humans. This suggested to others that hobbits had a complex culture.

Stone tool experts, however, say the tools are not particularly sophisticated. They are simple, made using techniques that hominids have used for millions of years and humans are still using today.

A team led by Adam Brumm of Australian National University has tried to show that hobbits were part of a line of Flores tool makers who had been chipping sharp flakes from stone for upwards of 700,000 years. The researchers based their analysis on more than 500 stone artifacts excavated at another Flores site 50 kilometers from Liang Bua and dated between 800,000 and 740,000 years ago. No *erectus* remains have been found on Flores so far, but paleoanthropologists assume they made and used the tools. The paper compared the very old tools with those found at Liang Bua and noted specific similarities.

The Flores tools are unique but also simple, according to Potts. "The tools we see on Flores, the older as well as the younger, cannot be exactly matched with anything that's known anywhere else" he says, "but the overall strategy of the technology and the overall size of the materials is consistent with what we find in mainland China."

Harold Dibble of the University of Pennsylvania Museum agrees. They would fit perfectly at a million-year-old site, he says, but also are a type made by native Australians today. "These are simple tools," says Dibble, "Could they have been made by a small brain? Sure."

The Politics of Hobbitry

H. floresiensis debates have been marked by a degree of acrimony that may seem excessive and even a bit scandalous to outsiders. But a number of paleoanthropologists opine that it's pretty much the usual fossil furor—even though it's been punctuated by public name-calling, a high level of rancor, and exceptionally gaudy episodes like the hobbit bones' unanticipated travels.

"I don't think there's anything special about this dispute except that it's taking place in a particular cultural context of Indonesian politics, which science gets drawn into, just as it does in every other country, at least certain fields of science," says Potts. "There are aspects of etiquette and the way of treating other people that may represent a bit of a clash between the Australian principal investigators and the Indonesian science community, which tends to be a little bit less, well, freelance about such things. I think that there may be a bit of a culture clash there."

There are also other theories about LB1 and compatriots. Holloway, for example, says he hasn't given up on his notion that hobbits may have been taken care of and kept as pets by other Flores *H. sapiens*, "sent out to fetch the wood or the occasional dead rat, bring it back, whatever!"

The most extreme proposition comes from Schwartz: "It's an interesting assemblage of bits and pieces that probably represent different kinds of hominids and maybe even some non-hominids," he argues. "It's more interesting to me that there might be these different morphologies represented, and the implications of that, than to do a Rube Goldberg hominid and say, 'Look how weird this is.'"

"To be very blunt, this is just stupid," says co-discoverer Peter Brown. For example, he explains, LB1's arm articulates with the skeleton, meaning they are from the same individual and not different taxa. But Brown thinks LB1's skeletal proportions and brain size are unlikely to be due to dwarfing of *H. erectus*. Instead, the most likely ancestor of *H. floresiensis* was small-bodied and small-brained. "This is not the same as saying the ancestor was an Australopithecine."

DNA analysis might help, but prospects are gloomy. The site is hot and wet, perfect for destroying genetic material. There's been at least one effort to find DNA in hobbit bone, carried out in the lab of ancient DNA specialist Svante Pääbo of the Max Planck Institute (Leipzig, Germany). It failed.

So on present evidence, the debate about whether hobbits were a different kind of human or simply deformed can't be settled. It is even possible that both sides are partly right.

AHIN'S

Sets
Panties
nicely
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PERS

RAYON
PAJAMAS
All colors and combinations 69c

Ladies' imported fancy all wool knitted GLOVES 59c

lobby. Teacher, Mr. M. L. Murdock, president of the Y. M. C. A.

LARGE EAGLE KILLED

EVANSVILLE, Ind. (UP)—An eagle having a wing spread of 16 feet was killed in the Wabash bottom lands recently by three Evansville hunters. Six shotgun charges were required to kill it.

Pedestrians Three

D. S. Houp took out a city bu
ing permit Friday for re-roo
his house at 401 South Fifth str

LABORATORY TES
CHECK EFFICACY
KELLOGG'S ALL-BR

Show Why This Delici
Cereal Overcomes Comm

Albuquerque Journal

New Mexico 12-10-1932

tate Supreme Court Holds Pension

ll Over 65 Will Be Paid Immediately

Judges Hold, Adding That upplemental Legislation Needd for 60-65; Pension Fund ust Now Be Created

(Associated Press)

Denver, Jan. 26.—The Colorado sueme court upheld today the conitutionality of the $45 old age penon amendment and declared it now effect to the extent of creating a

"Dead" Eagle, While Being Measured, Grabs Grover Man's Leg with Talons

Grover, Jan. 26.—William D. Woodard, Grover mail carrier, while out hunting Monday saw a large eagle flying around with a live rabbit clutched in its claws. He brought the big bird down with a well placed shot from a 22 rifle. Thinking the eagle killed by the shot and fall he threw it in the back of his car and drove over to the Henry Hillman ranch where he and Victor and Henry Hillman Jr., still thinking the agle dead stretched it out on the ground to measure it. Suddenly the eagle leaped into the air and sank its talons into Woodard's leg just above the knee; piercing a pair of heavy corduroy trousers and entering the flesh nearly an inch. It took the combined efforts of the three men to force the eagle to release its hold. The big bird measured seven feet and four inches from wing tip to wing tip. Mr. Woodard will have the eagle mounted and will keep it and a badly lacerated leg for souvenirs.

60 Fieldmen Told of Soil Saving Plan

Crop Workers of Sugar Company Hear Ag Expert; Much Expected of Scheme, N. R. McCreery Tells Group Here

The 1937 soil conservation program should accomplish more in one year than has been accomplished in the past ten years in encouraging crop rotation and achieving the benefits of rotation, N. R. McCreery, Colorado manager of the Great Western Sugar

Bus in Which 17 D

Greeley Daily Tribune

Colorado

1-26-1937

In The Past

15 YEARS AGO TODAY
January 10, 1924

Mrs. Emil Nick and daughter, Charlotte Marie, returned last night after a delightful visit with relatives in Memphis.

Hon. R. B. Campbell, who has been ill for several days, is now able to be out to the delight of his many friends.

Mr. Chas. W. Kittleman was selected today as a referee for the Georgetown-Loyola football game at New Orleans, Nov. 22. This *will be one of the leading intersectional games of this fall.* Mr. Kittleman will handle many other championship contests, among them the Tennessee - Mississippi Aggie game at Memphis, the Alabama-Sewanee game at Birmingham, and the Center-Alabama *game at Tuscaloosa.*

Mrs. L. A. White, in charge of the millinery department of Levi's, has left for the Eastern markets.

Mrs. Evana Bradshaw's pupils will present an interesting recital *at her residence Tuesday evening.*

One day last week a monster eagle swooped down into the back yard of Mrs. J. C. Davis at 704 Main street and helped himself to a chicken and was preparing to take a second when Mr. Rousseau *was called and he and Miss Davis* captured the big bird which measured eight feet from tip to tip of the wings. The eagle had crippled a wing as a result of somebody firing a shot at it somewhere.

25 YEARS AGO TODAY
January 10, 1914

Miss Berthe Scott has returned from a visit to friends in Baton

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home of Mr. a
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ing, Jan. 1.

Delta Democrat Times

Greenville, Mississippi

1-10-1939

Jackson, Tenn., Dec. 22.—Thomas Gaston, captain of the police, killed W. C. Strickland, Wednesday morning. The tragedy was the result of a card published in Tuesday's Evening Times over the signature of Strickland, making serious charges against Gaston's official conduct.

The Holy See Unaltered.

Rome, Dec. 22.—The emissaries of the French royalists have utterly failed to induce the holy see to alter its present friendly feeling toward the French republic, a feeling that has characterized the policy of the vatican for the past two years.

A Fatal Experiment.

Goshen, Ind., Dec. 22.—Rufus Den-

learned by the electrocution of ten men, reduces and does away with all possibility of any burning, scorching, etc.

A "Dog-Eater."

Memphis, Tenn., Dec. 22.—Residents near Montgomery park are in a state of feverish excitement over the appearance of a ferocious and misshapen monster which they call the "dog-eater." It is said that the mysterious beast looks like a calf, and that it has fetters attached to its neck that clank with its every movement. Its method of killing a dog is to bite its head off. It is supposed that the dog-eater is an escaped panther belonging to some menagerie.

Outlaw Gang Wiped Out.

Ft. Smith, Ark., Dec. 22.—Stan Rowe,

Sun, made its appearance her
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people."

Suicide Foerstel's Funer

St. Louis, Dec. 22.—The f
Edward Foerstel, late assi
treasurer, who committed sui

Hamilton Daily Republican
Hamilton, Ohio
12.22.1892

TRENTON EVENING TIMES, THURSDA

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FIND AN ANIMAL THAT EATS DOGS

Creature Shot While Feasting on Carcass of Mule.

Resembles Hyena

CHURCH POINT, LA., June 9.—Newton Barousse found that his mule colt, which was born the day before, had been killed during the night. The carcass was partly devoured. All of the colt's head and neck, the left foreleg and part of the shoulder were eaten. Mr. Barousse was unable to account for such a depredation, but he suspected the much talked of "dog eater." He allowed the carcass to remain unmolested, and decided to lie in wait the following night, hoping the animal would return.

His anticipation was realized, for that night at about ten o'clock Mr. Barousse saw the animal approaching. When within shooting distance he fired, and the animal was brought to the ground. After being wounded the animal did not yelp or howl as a dog usually does, but expressed its dissatisfaction at the reception by growls and snaps.

In the darkness Mr. Barousse hurriedly examined the animal, and left it for a well sized dog.

The following day J. E. Daigle passed by the carcass, and after close observation he pronounced it a cross between a wolf and a dog. Since then a great number of people have examined the body, and nearly all pronounce it a wolf.

R. B. Boettcher and Edward Daigle drove out to make an examination of the carcass. The animal was found to be of a red grayish black color, about four feet long, one and a half feet high in front and fully six inches lower in the hind quarters, giving the animal the appearance of sloping toward the back and the characteristic development of a hyena. The tail was only about six inches long and very thick. The animal's neck, shoulders and forelegs were of unusually large size and developed to double the proportion of the hind quarters. The head was bulky, with a long nose; very small, straight, erect ears and a mouth of unusually large size and ferocious appearance.

Covering the neck and shoulders was a growth of hair about three inches long, and running along the animal's back was a streak of stiff hair resembling hog bristles. From the appearance of the mane around the shoulders the animal showed traces of lion blood, but the conclusion was reached that it was a wolf.

R. B. Boettcher, who is familiar with the West Texas coyote, says the animal killed resembled that species of wolf, except it is larger.

Some call the animal killed a wolf, others say it is a hyena, while some think it is a catamount, but all agree that it must be the famous "dog eater."

During the last sixty days there has been some wild beast running at large in this community, attacking dogs and eating them. In the neighborhood of Branch the beast had jumped at a young man riding along in his buggy, and lately this animal was seen several times around Crowley. Owing to its fondness for eating dogs this beast became known as the "dog eater."

RAILROAD CASE WILL BE ARGUED

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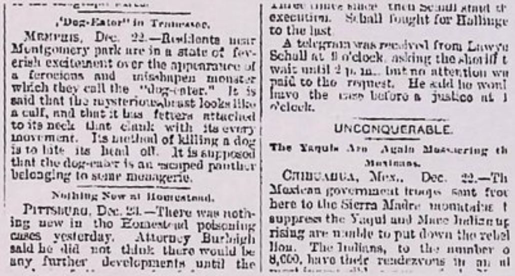
Trenton Evening Times
Trenton, NJ
6-9-1910



"Dog-Eater" in Tennessee.

MEMPHIS, Dec. 22.—Residents near Montgomery park are in a state of feverish excitement over the appearance of a ferocious and misshapen monster which they call the "dog-eater." It is said that the mysterious beast looks like a calf, and that it has fetters attached to its neck that clank with its every movement. Its method of killing a dog is to bite its head off. It is supposed that the dog-eater is an escaped panther belonging to some menagerie.

Nothing New at Homestead.

PITTSBURG, Dec. 23.—There was nothing new in the Homestead poisoning cases yesterday. Attorney Burleigh said he did not think there would be any further developments until the

execution. Schall fought for Hallinge to the last.

A telegram was received from Lawye Schall at 9 o'clock, asking the sheriff t wait until 2 p. m., but no attention wa paid to the request. He said he woul have the case before a justice at 1 o'clock.

UNCONQUERABLE.

The Yaquis Are Again Massacring th Mexicans.

CHIHUAHUA, Mex., Dec. 22.—Th Mexican government troops sent fro here to the Sierra Madre mountains t suppress the Yaqui and Mayo Indian uprising are unable to put down the rebellion. The Indians, to the number o 8,000, have their rendezvous in an al

Lima Daly News

Lima, ohio

12-24-1892

ly be refreshing

IN STOCK.

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Mills.

HARDWARE

by the Buffalo Shoal road, containing three acres, more or less.
L. HARRILL, Trustee.
L. C. Caldwell, Att'y.
June 29, 1900.

NORTH CAROLINA, } In the Superior
Iredell County. } Court.

W. A. Renager vs. William McDaniel, Frank McDaniel.

NOTICE.—The defendants above named will take notice that a special proceeding entitled as above has been commenced in the Superior Court of Iredell county for partition of certain land situated in Eagle Mills township, in Iredell county, and the said defendants will further take notice that they are required to appear at the office of the clerk of the Superior Court at the court house in Statesville, N. C, on the 24th day of July, 1900, and answer or demur to the petition in this action, or the plaintiff will apply to the court for the relief demanded in said petition.

J. A. HARTNESS,
Clerk Sup. Court.
J. B. Connelly, Att'y.
June 8, 1900.

Have You A 'Phone?

Every month adds to our list of subscribers. Our monthly card advertises your business in more than a hundred houses, and in nearly every shop, office and store in town.

It Would

reaching where it fell he found two shot dead. R.bey only has the sight of one eye but he seldom misses his mark. He is a terror to owls and hawks.

F.

Stony Point, N. C., July 7, 1900.

Could This Have Been the Santer?

Salisbury Truth Index.

Mr. C. W. Kinnerly informs us that his son in law, Mr. Tobe Clement, of Boone township, Davidson county, recently found some animal eating a litter of puppies he had. He killed the varmint, which proved to be very much like a greyhound, looking some points of resemblance—having a blunt nose and a long tapering tail. He is thought to have been the veritable dog eater, about which so much was said some time ago.

Appointments for Saturday Night, 14th.

The following appointments have been made for Saturday night, July 14.

Mr. H. P. Grier, Kennedy's school

ly in and none recovered.

ADVERTISEMENTS.

Arrest
disease by the timely use of Tutt's Liver Pills, an old and favorite remedy of increasing popularity. Always cures
SICK HEADACHE,
sour stomach, malaria, indigestion, torpid liver, constipation and all bilious diseases.
TUTT'S Liver PILLS

J. A. COOPER, Pres. J. O. IRVIN, Vice Pres.
GEO. H. BROWN, Cashier.

Capital, $50,000.00.
Surplus and Undivided Profits, $13,000.

The First National Bank

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STATESV

the Landmark
Statesville, NC
7-13-1900

Loans and Discounts	$215,054.12	Capital stock	$50,000.00
Overdrafts	709.75	Surplus	5,000.00
Furniture and Fixtures	3,495.84	Undivided profits (less expenses paid)	13,044.58
CASH & SIGHT EXCHANCE	104,768.86	DEPOSITS	255,983.98
	$324.028,56		$324,028.56

THE ABOVE STATEMENT IS CORRECT.

C. H. RIVES, President M. R. CHILCUTT, Active Vice Prest. H. P. REICH, Cashie

Want Ads

TERMS—CASH. One cent a word for first insertion. One-hal[illegible] cent a word for subsequent insertions. No classified advertisements accepted for less than 15 cents. Telephone your want ads to Number 4. If the advertisement has to be booked, one cent per word per issue will be charged.

Telephone Us Your Want Ad Now!

book of instruction. S. S. S. is sold everywhere by drug stores, department and general stores.

Want Ads

FOR RENT—Nicely furnished 6-room house for rent cheap during the summer. Have piano. Phone 302. 30tf

CITY LOANS—Straight 5 years, semi-annual or monthly payments. No catch plans. Reliable Fire and Tornado Insurance properly written. Ebey & Harrison Bros. 14-dtf

FOR SALE OR TRADE—Five room house. Cheap. Write J. L. Miles, Woodward, Okla. 29-26t*

SINGLE COMB REDS—Vigorous stock winter layers; satisfaction guaranteed; eggs $1.50 for 16. John Thrasher. 611 W. Third, Ada, Okla.

without dogs.

DOG-EATER IS A BLESSING

Flushing Man Wants Nescopek's Mysterious Monster—Many Canines Destroyed.

Nescopeck, Pa.—An echo of the excitement here incident to the visits of a dog-eating animal has come in a telegram from Flushing, N. Y., an Auburndale man wanting the monster if Nescopeck fails to appreciate the blessing it has received.

The dog-eater has been causing havoc among the canine tribe by nightly invasions, but as yet its real identity is a mystery. All it does is to destroy dogs.

That Nescopeck has had a special dispensation of Providence in the coming of this terrifying dog-eater is the conclusion of the Long Island resident, and from whom Burgess Smith has received a letter. He asks that the dog-eater be shipped to his home town at once.

Ta

Every letter sent
in advertising the

The N

has the form to
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NEW

Evening News

Ada, Oklahoma
5-13-1913

TRENTON EVENING TIMES, THURSDA

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FIND AN ANIMAL THAT EATS DOGS

Creature Shot While Feasting on Carcass of Mule.

Resembles Hyena

CHURCH POINT, LA., June 9.—Newton Barousse found that his mule colt, which was born the day before, had been killed during the night. The carcass was partly devoured. All of the colt's head and neck, the left foreleg and part of the shoulder were eaten. Mr. Barousse was unable to account for such a depredation, but he suspected the much talked of "dog eater." He allowed the carcass to remain unmolested, and decided to lie in wait the following night, hoping the animal would return.

His anticipation was realized, for that night at about ten o'clock Mr. Barousse saw the animal approaching. When within shooting distance he fired, and the animal was brought to the ground. After being wounded the animal did not yelp or howl as a dog usually does, but expressed its dissatisfaction at the reception by growls and snaps.

In the darkness Mr. Barousse hurriedly examined the animal, and left it for a well sized dog.

The following day J. E. Daigle passed by the carcass, and after close observation he pronounced it a cross between a wolf and a dog. Since then a great number of people have examined the body, and nearly all pronounce it a wolf.

R. B. Boettcher and Edward Daigle drove out to make on examination of the carcass. The animal was found to be of a red grayish black color, about four feet long, one and a half feet high in front and fully six inches lower in the hind quarters, giving the animal the appearance of sloping toward the back and the characteristic development of a hyena. The tail was only about six inches long and very thick. The animal's neck, shoulders and forelegs were of unusually large size and developed to double the proportion of the hind quarters. The head was bulky, with a long nose, very small, straight, erect ears and a mouth of unusually large size and ferocious appearance.

Covering the neck and shoulders was a growth of hair about three inches long, and running along the animal's back was a streak of stiff hair resembling hog bristles. From the appearance of the mane around the shoulders the animal showed traces of lion blood, but the conclusion was reached that it was a wolf.

R. B. Boettcher, who is familiar with the West Texas coyote, says the animal killed resembled that species of wolf, except it is larger.

Some call the animal killed a wolf, others say it is a hyena, while some think it is a catamount, but all agree that it must be the famous "dog eater."

During the last sixty days there has been some wild beast running at large in this community, attacking dogs and eating them. In the neighborhood of Branch the beast had jumped at a young man riding along in his buggy, and lately this animal was seen several times around Crowley. Owing to its fondness for eating dogs this beast became known as the "dog eater."

RAILROAD CASE
WILL BE ARGUED

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TRENTON
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Second Church.

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Trenton Evening News
Trenton, NJ
6-9-1910

n able to find no trace. Mr. More-d offers a reward for information.

A Police Captain Commits Murder.

ACKSON, Tenn., Dec. 22.—Thomas ston, captain of the police, killed W. Strickland, Wednesday morning. The gedy was the result of a card pub-ed in Tuesday's Evening Times over signature of Strickland, making se-us charges against Gaston's official duct.

The Holy See Unaltered.

lome, Dec. 22.—The emissaries of the nch royalists have utterly failed to uce the holy see to alter its present endly feeling toward the French re-blic, a feeling that has characterized policy of the vatican for the past years.

A Fatal Experiment.

oshen, Ind., Dec. 22.—Rufus Den-, of Napanee, attempted to beat a

contact was sufficient not only to make life extinct, but this modern appliance, which has grown out of experience learned by the electrocution of ten men, reduces and does away with all possibility of any burning, scorching, etc.

A "Dog-Eater."

MEMPHIS, Tenn., Dec. 22.—Residents near Montgomery park are in a state of feverish excitement over the appearance of a ferocious and misshapen monster which they call the "dog-eater." It is said that the mysterious beast looks like a calf, and that it has fetters attached to its neck that clank with its every movement. Its method of killing a dog is to bite its head off. It is supposed that the dog-eater is an escaped panther belonging to some menagerie.

Outlaw Gang Wiped Out.

FT. SMITH, Ark., Dec. 22.—Stan Rowe, the notorious outlaw and desperado,

A New Canadian Annexation Organ.

TORONTO, Ont., Dec. 22.—The first issue of an evening paper called The Sun, made its appearance here Wednesday night. Its avowed object is to advocate the annexation of Canada to the United States. In its "salutatory" it says: "We have no hesitation in saying our lack of like progress has been and is entirely due to our unhappy separation from the republic of the United States. With England we have no quarrel, nor are we unmindful of her great services on behalf of human freedom, but our hearts and energies should be devoted to improving the condition of our own people."

Suicide Foerstel's Funeral.

ST. LOUIS, Dec. 22.—The funeral of Edward Foerstel, late assistant city treasurer, who committed suicide Monday, took place at 11 o'clock Wednesday

Hamilton Daily Republican
Hamilton, OH
12-22-1892

rd of before, things that
ith the strange silvery
oonlit splendor. There
usic this summer. She
d this girl who came
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ould marry before she
me. He was masterful.
ticked Lame Bear and
out his business even
she wished the Indian

d suddenly and saw the
her from the rock above.
down full length on it,
one palm, her eyes un-
a panther, for all the
hought with a shiver.
e you been, Kit?" she
be natural and pleas-
lown here, won't you?"
her head slowly. Her
eyes looked sad and
looked down at the
Sloane stood mending a
on his saddle
o see Lame Bear get
' she said dreamily.
e will come He is just
rriage sheds now, creep-
up like a thunder cloud,

ed the girl, too horrified
he looked for Dave, but
peared the other way
house. "Kit, you're not
le isn't there."
to her as she scrambled
, and smiled gravely.
re. I sent for him to
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ou know who my people

ed for the girl's shoul-
ok her as if to make her
ne. As she rolled over,
el of her rifle lay on the
uncoiled snake; straight

be an idiot," she said,
u've set him on to kill

up at her, close lipped.
I see him kiss you last
nd long. You can kiss
etty soon I let you."
cat!" It came between
She struck blindly, try-
the girl to one side, and
knew she wanted the
knee was on her breast,
ying to grip her wrists.
estnut hair slipped down
ce. She gave a cry of
felt Kit's teeth sink in-
She dared not call for
ot shout a warning for
ear would be the first to
e loosened her grip on
rose to her feet, the rifle

to get up, I'll shoot you.
anything," she said
"I will!" Then she
fle with steady fingers at
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er to shoot well her first
anch, but her fingers felt
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ls were empty, desperate-
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opped the rifle, and cov-
with her hands, sobbing.
ised her head, Kit was

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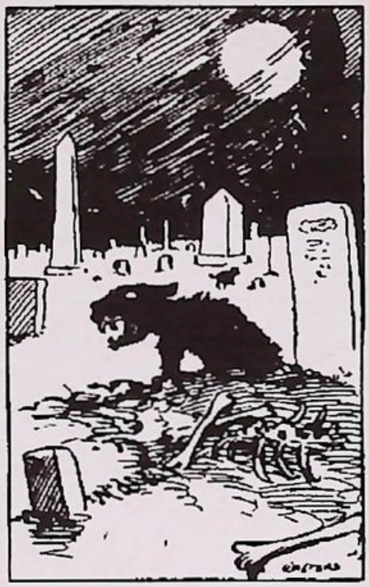
MAKES ITS HOME IN DESECRATED GRAVES

Mysterious Beast Rends Coffins and Scatters Human Bones—Roars Scare Women.

Shelbyville, Ind.—The most uncanny sensation that has stirred Shelby county in recent years has taken a firm grip on residents near the Patterson cemetery, east of Lewis creek. Graves in the cemetery are being despoiled by some animal or agency, and none of those who has taken an interest in the situation has been able to solve the mystery.

Burrowing into the graves, the beast rends coffins, scatters bits of broken wood, spinal columns, arms and leg bones on the surface and roars like a lion when intruders approach too near the scene of its operations. At first the belief prevailed that woodchucks were doing the work, but this theory has been abandoned, as none of the animals have been seen in the cemetery.



Graves Were Being Despoiled.

The situation was first discovered by women who went to the cemetery to put some graves of relatives in better condition They discovered a great hole in one of the graves. They started to investigate, but were greeted with a roar from the grave which sent them from the cemetery with quickened steps and blanched faces They have not since returned

Men of the neighborhood then went to the cemetery armed with picks, shovels and guns. They found bones and pieces of coffins scattered over the graveyard. They dug into several despoiled graves and found they had been used as the home of some animal, but they have been unable to determine its species

The work was pursued with vigor until the men struck a grave where it was feared the despoiler was at work. There the men lost their nerve and some declared they were as badly frightened as the women. The work of trying to unravel the mystery is still on and the despoiler is as busy as ever.

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Stevens Point Daily Journal
Stevens Point, Wisconsin
3-17-1913

KINKAJOU IT MAY BE

SPECULATION STILL RIFE AS TO WHAT STRANGE ANIMAL MAY BE ROAMING.

IN THE VICINITY AROUND MANSFIELD

That the Noises It Makes, According To Veracious Witnesses, are Awe-Inspiring and Blood-Curdling—Thought to be Changing Its Base Of Operations to the Southeastern Section of the Township.

On the very face of it, it seems like the quintessence of absurdity to imagine for a minute that such an animal as the kinkajou could have wandered from its native heath and come into this county, in fact into this immediate vicinity, without having been detected and dispatched while it was on its way.

Yet many of the people who have been startled by the awe-inspiring noises which have seemed to emanate from the throat of some wild beast, which it is claimed has been causing cold chills to run up and down the spinal column of the residents of the vicinity just northeast of the city, have reached such a degree of nervousness that they would not be greatly surprised if a kinkajou of the very fiercest kind would suddenly spring upon them.

LOOKS LIKE A "TAGGER."

The mere idea of there being an animal of this kind in this section of the country is enough to cause anyone to gasp with fear but the danger is not particularly imminent in view of the fact that even A. J. Baughman fails to remember ever having seen an animal of that sort in this section of the county or in the vicinity of Bellville.

Equally improbable is the assertion of some others that the animal in question is nothing more or less than a loplomys, and it is hard to see why people should make assertions of this kind or even give credence to a story that there is any kind of an unusual animal running around so near to a thickly populated community as this is.

But even at that, it is a little hard to doubt the reliability of so many veracious citizens as claim to have heard the roaring, snarling, whining beast gallivanting around while they were on their way home, or rousing them from their slumbers by seeming to come into their very dooryard.

IT MAY COME TO THIS.

But what would seem like the most foolish suggestion of all is that the animal is a malacopoda. Now who in the world would ever imagine that a malacopoda would go bothering around in this part of the country? Of all the animals of more or less wildness that this one is apt to be it may be positively stated that the malacopoda is the least apt, and people who have been brought up with a particular fear of the malacopoda instilled in their natures since earliest childhood are urged to have no further fear on this score.

And in the same manner there would appear to be no particular reason why the koala, the nyula, the cacomixle, the rhinolophid and the pterodactyl should not also be dismissed with a mere mention.

But with all of these out of the way the real identity of the wild animal which has brought on such a reign of terror among the people living in the vicinity of the northeast part of the city, remains as much of a mystery as ever and the people who have heard the noises made by the beast refuse to be convinced that they have simply "been hearing things" and insist that there is in reality some grounds for their fears.

Thus far, however, the animal—if there really is an animal—has been sufficiently crafty to avoid all of the many hunters who have been on the lookout for it and seems to have kept itself concealed in some of the nearby woods during the day, only venturing out after nightfall in order to satisfy its appetite and it would appear that on these nocturnal visits its devotes practically all of its attention to the chicken roosts and a number of the residents of the section infested can attest its fondness for a poultry diet by a noticeable shortage in their chicken population.

There was an unauthenticated report floating about Saturday that sounds not unlike those produced by the animal which is supposed to be making its headquarters northeast of the city, had been heard by people passing along the road southeast of town and it was thought possible that this same mysterious beast had sought a new pasture, but the information at hand is too vague to carry much weight.

PASTY FOOD

Too Commonly Used.

The use of pasty cereals is not advisable. A physician says: "Pasty cereals are very indigestible and a bad thing for the stomach, causing a depressed feeling and quite a train of disorders, particularly of the intestines and nerves.

"Cereals, such as wheat and oats, can be cooked long enough and well enough to fit them for human use, but the ordinary way of cooking leaves them in a pasty condition."

An Indiana man says: "My physician prohibited the use of oats and

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WORKING AT $1.50 A DAY

As Jurors While Paying Hired Hands $2 a Day.

The case of Riley Amsbaugh vs. the board of Richland county commissioners et al, the proceeding to assess damages for the destruction of the more or less famous Campbell mill dam, southeast of the city, has been tried a second time and it is to be hoped that no error will be found in the proceedings this time, as it seems to cost the county more money in the way of damages when a new trial is had, to say nothing of the increased costs which are saddled on. Another thing about the matter is that the prosecuting attorney cannot get any extra fees these days for helping to try cases in which the county is interested. The attorneys for the landowner certainly had things coming their way at this second trial. In the first place they threatened to have a change of venue and have the case tried elsewhere. The result was that the jury was entirely composed of farmers, or men who are residents outside of the city. One man who had been a farmer, but who is now living at Bellville, was on the jury, but all the rest where almost pure farmers. This certainly made it a lop-sided jury in favor of the landowner on the face of the proceedings. The jury got the case along about 3 o'clock in the afternoon. As they all wanted to get home that night, it was arranged to pay them off then and there before they retired to deliberate for the reason that when they got through with the case the treasurer's office would likely have been closed and they would not have been able to get their money. When the jurymen got their money there was a howl of large sized proportions. It seems that the law provides in this class of condemnation cases that the jurymen shall receive $1.50 per day, whereas the regular juryman gets $2 per day. The men kicked long and hard on account of the size of their checks. They stated that in the first place this is a very busy time of year for them. Some of them had harvest hands working for them at the rate of $2 per day, while they, the owners of the farms, were on the jury at Mansfield for four days at the rate of $1.50 per day. Although the jury men kicked pretty hard about the size of their stipends they got no more and were finally chased into a room where they deliberated two hours before returning a verdict. It was the first time a jury has been paid

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A JOLLY TIME AMONG ELK

THEIR ANNUAL OUTING SOUTH PARK AND THE EVENING DANCE.

DAY AND EVENING OF PLEAS

All Sorts of Sporting Stunts, In ding Base Ball Game and Var Races and Diversions—A Bal the Elk Home at Night—Prog of Events and the Various Winn

Although the day began with and it seemed that the "clearing was only temporary, the local had a delightful day for their ou on Friday, and despite the abs from the city of many of the E and the staying away of many cause of the threatening weat over two hundred members of lodge, with their families and la making a company of between and 300, enjoyed the afternoon South park after the most appro fashion.

All of the committees had good work to make the event a cess and it was such in every res

The afternoon was spent in va pastimes and sports, and about m. supper was laid on long u in the grove. And it was a good per, too. Every Elk will testify his wife is an expert in provi good things to eat, and when the certed efforts of all these ladies spread on the festal board one imagine the result.

Old Elks and young Elks there. The men of families, the b elor and their best girls, the te rarily "bachelor hall" contingent boys and girls, big and little, all one happy family, were there and testify that the event was an e able one.

There was a long bill of sport which prizes were awarded and t contests aroused much exciteme well as amusement, the complete tails of which would fill more means than the News has at its di al, so that the programme, with winners, must suffice. It was as follows:

EVENT NO. 1.

Guessing Contest—

For Men—Prize, walking s won by A. "Tilly" Reynolds.

For Ladies—Prize, set candel won by Catherine Ford.

EVENT NO. 2.

Base Ball Game—

Winning team prize, box fin gars, won by Jay Dirlam's nine.

Losing team, prize, nine fine ons, won by H. W. Hartman's ni

Score 18 to 11, 6 innings.

EVENT NO. 3.

Running races—

Men under forty, 100 yds; p pair suspenders, won by Jay Di

Men over forty, 150 yds; s stein, won by Jacob Rinehart.

(Jake says he's only 27).

For ladies, 50 yds, prize, silver receiver, won by Martha Gibson.

EVENT NO. 4.

Stepping contest (blindfolded)

For men, 60 paces, prize, smo set, won by L. Freundlich.

For ladies, 40 paces, prize, um la, won by Mrs. Jacob Rinehart.

EVENT NO. 5.

Stake race—

For men, prize, necktie, won b J. L. Stevens.

For ladies, prize, silver top po box, won by Mrs. H. N. Redding.

EVENT NO. 6.

Lean men's race(fat men d have enough to run)—

Prize, travelling flask, won l W. Faust.

EVENT NO. 7.

Ball throwing contest—

Men's, prize, tobacco jar, wo C. B. Bushnell.

Ladies, prize, card case, wo Miss Martha Maxwell.

After the pleasurable after and the supper at the park, the m makers adjourned to the city a the Elk home where the ev was devoted to terpsichorean p ures, cards and other diversions.

And prizes were awarded here There were dancing contests an way many couples put the best forward, kept the judges busy t cide upon the winners, but aw were finally made as follows:

Waltz—

To gentleman, prize, pocket Harland M. Wirth.

To lady, Miss Mary Small.

Two Step—

To lady, prize, tooth brush b Mrs. J. J. McIntyre.

To gentleman, prize, pair su ders, B. Burke Brown.

To couple appearing to best a tage in the two step—

Mansfield News
Mansfield, Ohio
8-17-1907

KINKAJOU IT MAY BE

SPECULATION STILL RIFE AS TO WHAT STRANGE ANIMAL MAY BE ROAMING.

IN THE VICINITY AROUND MANSFIELD

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Hobbits are so different from anything else in the hominid record that calling them a new human species is by no means crazy. But even some scientists who buy the new species argument think there may have been something wrong with LB1 and that the much-disputed brain is indeed abnormal.

What is the hobbit? "I don't know," Holloway admits, and he has plenty of company. But, he observes, the puzzling hobbits don't change the major outlines of human evolution. "I think it's sort of a side issue."

Further Reading

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LOOKS LIKE A "TAGGER."

cold chills to run up and down the spinal column of the residents of the vicinity just northeast of the city, have reached such a degree of nervousness that they would not be greatly surprised if a kinkajou of the very fiercest kind would suddenly spring upon them.

The mere idea of there being an animal of this kind in this section of the country is enough to cause anyone to gasp with fear but the danger is not particularly imminent in view of the fact that even A. J. Baughman fails to remember ever having seen an animal of that sort in this section of the county or in the vicinity of Bellville.

Equally improbable is the assertion of some others that the animal in question is nothing more or less than a loplomys, and it is hard to see why people should make assertions of this kind or even give credence to a story that there is any kind of an unusual animal running around so near to a thickly populated community as this is.

But even at that, it is a little hard to doubt the reliability of so many veracious citizens as claim to have heard the roaring, snarling, whining beast gallivanting around while they were on their way home, or rousing them from their slumbers by seeming to come into their very dooryard.

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Brain shape in human microcephalics and *Homo floresiensis*

Dean Falk*[†], Charles Hildebolt[‡], Kirk Smith[‡], M. J. Morwood[§], Thomas Sutikna[¶], Jatmiko[¶], E. Wayhu Saptomo[¶], Herwig Imhof[‖], Horst Seidler**, and Fred Prior[‡]

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Edited by Marcus E. Raichle, Washington University School of Medicine, St. Louis, MO, and approved December 7, 2006 (received for review October 18, 2006)

Because the cranial capacity of LB1 (*Homo floresiensis*) is only 417 cm^3, some workers propose that it represents a microcephalic *Homo sapiens* rather than a new species. This hypothesis is difficult to assess, however, without a clear understanding of how brain shape of microcephalics compares with that of normal humans. We compare three-dimensional computed tomographic reconstructions of the internal braincases (virtual endocasts that reproduce details of external brain morphology, including cranial capacities and shape) from a sample of 9 microcephalic humans and 10 normal humans. Discriminant and canonical analyses are used to identify two variables that classify normal and microcephalic humans with 100% success. The classification functions classify the virtual endocast from LB1 with normal humans rather than microcephalics. On the other hand, our classification functions classify a pathological *H. sapiens* specimen that, like LB1, represents an ≈3-foot-tall adult female and an adult Basuto microcephalic woman that is alleged to have an endocast similar to LB1's with the microcephalic humans. Although microcephaly is genetically and clinically variable, virtual endocasts from our highly heterogeneous sample share similarities in protruding and proportionately large cerebella and relatively narrow, flattened orbital surfaces compared with normal humans. These findings have relevance for hypotheses regarding the genetic substrates of hominin brain evolution and may have medical diagnostic value. Despite LB1's having brain shape features that sort it with normal humans rather than microcephalics, other shape features and its small brain size are consistent with its assignment to a separate species.

virtual endocast

Microcephaly ("small head") is a condition in which adults typically achieve brain masses of 400–500 g (or cubic centimeters if cranial capacity is used as a surrogate for brain size) and are moderately to severely mentally retarded (1–15). Affected individuals have been reported from all over the world, frequently from consanguineous unions (9, 10, 16–26). Traditionally, the terms "primary microcephaly," "true microcephaly," "microcephaly vera," and "primary autosomal recessive microcephaly" (MCPH, MIM #251200; Online Mendelian Inheritance in Man, www.ncbi.nlm.nih.gov/omim) have been used to describe individuals who were born with abnormally small brains, sloping foreheads, and prominent ears but lacked other "neurological, growth, health, or dysmorphic findings, and [had] no discernible prenatal or postnatal syndrome or cause, such as an aberrant chromosome or structural brain anomaly" (16). [Because MCPH directly affects neurogenesis rather than growth of the skull, some prefer the term "micrencephaly" (27).] MCPH has been distinguished from microcephaly that is acquired or "secondary" to degenerative brain disorders. Since 1998, however, at least seven autosomal recessive microcephalic loci and five associated genes have been identified [see supporting information (SI) Table 2], and all of the general maladies that, by definition, were previously excluded from MCPH have now been observed in one or more affected individuals (see *SI Text*). Variable phenotypes are occasionally correlated with particular kinds of mutations within a given gene [e.g., deletions are generally more severe than duplications (28)] and may be representatives of a continuous phenotype (13, 20, 29). Even the signature sloping forehead of primary microcephalics is occasionally lacking in affected individuals (17, 24) (SI Fig. 4). Primary microcephaly is therefore a genetically and clinically heterogeneous condition that begs the traditional "diagnosis of exclusion" (13, 25, 26, 30).

Given all of this heterogeneity, are there any features other than small size that distinguish microcephalic brains from those of normal humans? To address this question, we compared three-dimensional computed tomographic reconstructions of the internal braincase (virtual endocasts) that reproduce details of external brain morphology, including vessels, sinuses, some sulci, cranial capacities, and shape (1) from a sample of 9 heterogeneous microcephalic humans and 10 normal humans (Fig. 1 and Table 1). Because of the controversial suggestion that LB1 (*Homo floresiensis*) may have been a microcephalic *Homo sapiens* rather than a new species (2–7), we reassessed its virtual endocast in light of our findings. We also assessed the virtual endocasts of a microcephalic woman whose endocast is alleged to resemble that of LB1 (4) and a pathological *H. sapiens* specimen that, like LB1, represents an ≈3-foot-tall adult female. [Although this specimen was labeled as a "dwarf," this heterogeneous medical condition (MCPH, MIM #210710; Online Mendelian Inheritance in Man, www.ncbi.nlm.nih.gov/omim) should not be confused with endemic dwarfism.]

Results

Virtual endocasts were electronically measured to obtain cranial capacities that are traditionally used to approximate brain mass (Table 1). Brain size of microcephalics departs further below normal values as microcephalics mature because it reaches its maximum earlier than is the case for normal humans and then decreases in size (27). For this reason, we estimate the upper limits of brain size for adult microcephalics from data for that group (Michel Hofman, personal communication) rather than using normal humans as a reference population. The mean brain weight for 25 microcephalics (sexes combined) aged 21–74 years

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Author contributions: D.F., C.H., and K.S. designed research; D.F., C.H., K.S., M.J.M., T.S., J., E.W.S., H.I., H.S., and F.P. performed research; D.F., C.H., and K.S. analyzed data; and D.F., C.H., K.S., M.J.M., and F.P. wrote the paper.

The authors declare no conflict of interest.

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Abbreviation: CT, computed tomographic.

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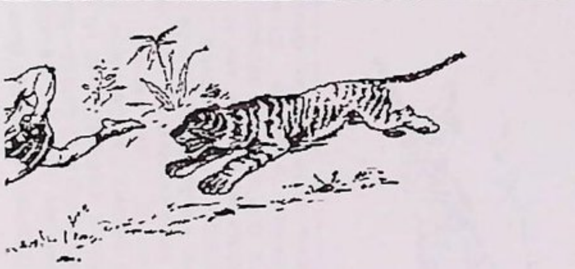
And in the same manner there would appear to be no particular reason why the koala, the nyula, the cacomixle, the rhinolophid and the pterodactyl should not also be dismissed with a mere mention.

But with all of these out of the way the real identity of the wild animal which has brought on such a reign of terror among the people living in the vicinity of the northeast part of the city, remains as much of a mystery as ever and the people who have heard the noises made by the beast refuse to be convinced that they have simply "been hearing things" and insist that there is in reality some grounds for their fears.

Thus far, however, the animal—if there really is an animal—has been sufficiently crafty to avoid all of the many hunters who have been on the lookout for it and seems to have kept itself concealed in some of the nearby woods during the day, only venturing out after nightfall in order to satisfy its appetite and it would appear that on these nocturnal visits its devotes practically all of its attention to the chicken roosts and a number of the residents of the section infested can attest its fondness for a poultry diet by a noticeable shortage in their chicken population.



LOOKS LIKE A "TAGGER."

There was an unauthenticated report floating about Saturday that sounds not unlike those produced by the animal which is supposed to be making its headquarters northeast of the city, had been heard by people passing along the road southeast of town and it was thought possible that this same mysterious beast had sought a new pasture, but the information at hand is too vague to carry much weight.

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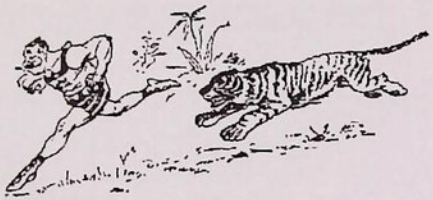
Yet many of the people who have been startled by the awe-inspiring noises which have seemed to emanate from the throat of some wild beast, which it is claimed, has been causing cold chills to run up and down the spinal column of the residents of


LOOKS LIKE A "TAGGER."

reality some grounds for their fears.

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and the staying away of many because of the threatening weather, over two hundred members of the lodge, with their families and ladies making a company of between 400 and 500, enjoyed the afternoon at South park after the most approved fashion.

All of the committees had done good work to make the event a success and it was such in every respect.

The afternoon was spent in various pastimes and sports, and about 6 p. m. supper was laid on long tables in the grove. And it was a good supper, too. Every Elk will testify that his wife is an expert in providing good things to eat, and when the concerted efforts of all these ladies are spread on the festal board one can imagine the result.

Old Elks and young Elks were there. The men of families, the bachelor and their best girls, the temporarily "bachelor hall" contingent, the boys and girls, big and little, all like one happy family, were there and can testify that the event was an enjoyable one.

There was a long bill of sports for

final one before there is a general meeting for the preparation of the report that must be made to the governor. The members have discovered a wide diversity of view as to what the laws should be with a view to listing all of the property and at the same time secure a fair and equitable rate. Under the wording of the resolution providing for the appointment of the commission, the report is to go to the governor, and the bill to follow will be built along the line of the recommendations of the body.

The anti-saloon league has begun its campaign for the enactment of the Rose county local option bill, that now sleeps with the senate committee on temperance. In spite of the fact that at the recent meeting of the members of the assembly at Cedar Point, where the feeling appeared to be against the enactment of such a law at this time, it is understood that the league is working through its many powerful agencies to secure votes for the bill. In some cases members who are serving their first terms in the senate and house have been threatened with the vengeance

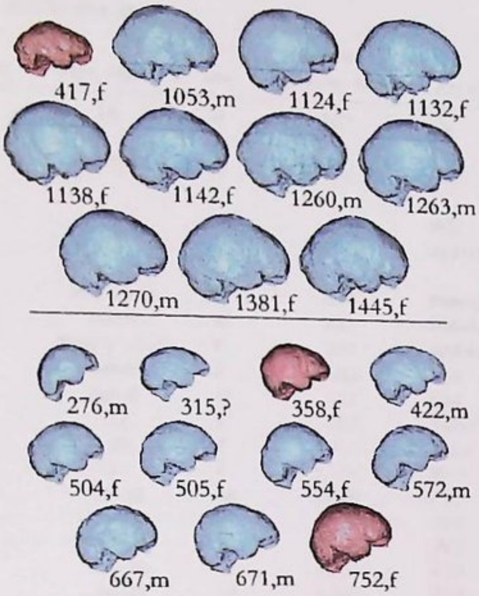

Fig. 1. Comparisons of right lateral views of virtual endocasts from 10 normal humans (*Upper*, blue) and 9 microcephalics (*Lower*, blue). Discriminant and canonical analyses classify the virtual endocast of LB1 [417,f (*Upper*, red)] with normal humans and those from a female human dwarf (752,f, *Lower*) and the Basuto woman (358,f, *Lower*) with microcephalics. Images are labeled with their cranial capacities and sex: f, female; m, male (see Table 1 for details about individual specimens).

is 365 g with a SD of 95 (±3 SD, 80–650 g), which gives an upper limit of 650 g(cm^3) (see *SI Text*). Because this upper limit is considerably higher than the 400–500 g widely quoted as typical for primary microcephalics (9–15), we believe the estimated range is likely to incorporate most, if not all, members of that group. Although two of the microcephalics in our sample have capacities that were slightly above the upper limit, we included them in our initial analyses to increase our sample size (Table 1). One of them (UV 3795, 667 cm^3) was porencephalic (a condition characterized by fluid-filled cavities in the brain) and therefore a secondary microcephalic. The mean capacity for our nine microcephalics is 498 cm^3, and the mean for the seven that have cranial capacities below 650 cm^3 is 450 cm^3. These data suggest the clinically testable hypothesis that adults that are diagnosed as microcephalics and have brain volumes exceeding 650 cm^3 are secondary microcephalics.

Eight measurements were obtained electronically from the virtual endocasts and used to generate four ratios that we thought would discriminate between the two groups {Fig. 2: 2/1 (cerebellar protrusion), [2–4]/1 (relative length posterior base), 6/5 (relative cerebellar width), and 8/6 (relative frontal breadth); see *Materials and Methods*}. Using the four variables, discriminant and canonical analyses were used to study shape differences between microcephalic humans (n = 9) and normal humans (n = 10), and backward stepwise discriminant analysis was used to select the most powerful discriminators (SI Table 3). All four variables, when analyzed individually, resulted in statistically significant discriminant functions ($P < 0.001$; SI Table 4 and SI Fig. 5). With the resulting classification functions, cerebellar protrusion misclassified one microcephalic as a normal human (SI Table 3). Relative length posterior base misclassified a normal human as a microcephalic. Relative cerebellar width misclassified three microcephalics as normal humans, and relative frontal breadth misclassified two microcephalics as normal humans. The backward stepwise discriminant analysis retained two variables (cerebellar protrusion 2/1 and relative frontal breadth 8/6; SI Tables 3 and 4). Both ratios and the resulting discriminant function (root) were highly significant ($P \leq 0.002$), with the most heavily weighted ratio being cerebellar protrusion. Fig. 3 is a scatter plot of these two variables, which classified microcephalics (M) and normal humans (NH) with 100% success. LB1, the human dwarf, and the Basuto woman (which were not used to develop the discriminant and classification functions) were then classified. LB1 sorted with normal humans (>99% probability) and the other two classified as microcephalics (human dwarf >99% probability and Basuto woman 99% probability; Fig. 3).

When we began our study, we did not know the size or shape of the dwarf's virtual endocast but suspected that the 3-foot-tall specimen might be a microcephalic. The cranial capacity of 752 cm^3 that we obtained for the human dwarf is ≈100 cm^3 above the upper limit we estimate for primary microcephalics. Because the dwarf's brain size is considerably smaller than the mean of ≈1,300 cm^3 for normal women (27) and because our analysis classified the dwarf's brain shape as being that of a microcephalic, we believe it represents a variant of microcephalic primordial dwarfism (MCPH, MIM #210710; Online Mendelian Inheritance in Man, www.ncbi.nlm.nih.gov/omim) and is therefore a secondary microcephalic. LB1's 417-cm^3 endocast, on the other hand, classified with normal humans, indicating that its brain shape differs completely from that of this 3-foot-tall-adult secondary microcephalic female *H. sapiens*.

Because LB1's capacity is only 417 cm^3 (1), we were particularly interested in learning what shape features may discriminate the smaller-brained microcephalics from normal humans. A second analysis was performed after deleting the two microcephalic brains with volumes >650 cm^3 from the data set. The most powerful discriminators from our first analysis (individually and in combination) were, again, used to derive new classification functions, which were used to classify cases. As in the first analysis, cerebellar protrusion misclassified one microcephalic as a normal human. Relative frontal breadth misclassified no case, however, compared with the first analysis in which it misclassified the two largest microcephalics as normal humans. The combination of these two discriminators misclassified no case (with posterior probabilities for group membership exceeding 0.9999 for all cases) and, again, LB1 was classified with normal humans and the dwarf with the microcephalics. When the two big microcephalics were not used to create the classification function, the Basuto woman classified with microcephalics with 100% probability. These data suggest the testable hypothesis that smaller-brained primary microcephalics may have smaller relative frontal breadths than bigger-brained (possibly secondary) microcephalics, and raises the possibility that future research on virtual endocasts and clinical imaging studies could reveal phenotypic characterizations that might have diagnostic significance for known microcephaly loci (SI Table 2) (26).

Discussion

Because the sample of microcephalics we used to develop the classification functions contains only nine individuals, one might argue that it is too small to be representative. As is the case for fossil hominins, microcephalic skulls are rare and our sample has the advantage of being extremely heterogeneous and therefore more likely to capture general features that may characterize microcephaly. Our specimens represent both sexes, ages ranging from 10 years old to adult, cranial capacities from 276 to 671 cm^3, and come from different parts of the world including Europe, the United States, South America, and Africa (Table 1). It contains both primary and secondary microcephalics, although we believe most, if not all, of the individuals below 650 cm^3 are probably primary microcephalics, which is the form of microcephaly most often attributed to LB1. LB1 resembles normal humans in the

KINKAJOU IT MAY BE

SPECULATION STILL RIFE AS TO WHAT STRANGE ANIMAL MAY BE ROAMING,

IN THE VICINITY AROUND MANSFIELD

But the Noises It Makes, According To Veracious Witnesses, are Awe-Inspiring and Blood-Curdling—Thought to be Changing Its Base Of Operations to the Southeastern Section of the Township.

On the very face of it, it seems like the quintessence of absurdity to imagine for a minute that such an animal as the kinkajou could have wandered from its native heath and come into this county, in fact into this immediate vicinity, without having been detected and dispatched while it was on its way.

Yet many of the people who have been startled by the awe-inspiring noises which have seemed to emanate from the throat of some wild beast, which it is claimed has been causing cold chills to run up and down the spinal column of the residents of the vicinity just northeast of the city, have reached such a degree of nervousness that they would not be greatly surprised if a kinkajou of the very fiercest kind would suddenly spring upon them.

LOOKS LIKE A "TAGGER."

The mere idea of there being an animal of this kind in this section of the country is enough to cause anyone to gasp with fear but the danger is not particularly imminent in view of the fact that even A. J. Baughman fails to remember ever having seen an animal of that sort in this section of the county or in the vicinity of Bellville.

Equally improbable is the assertion of some others that the animal in question is nothing more or less than a loplomys, and it is hard to see why people should make assertions of this kind or even give credence to a story that there is any kind of an unusual animal running around so near to a thickly populated community as this is.

But even at that, it is a little hard to doubt the reliability of so many veracious citizens as claim to have heard the roaring, snarling, whining beast gallivanting around while they were on their way home, or rousing them from their slumbers by seeming to come into their very dooryard.

IT MAY COME TO THIS.

But what would seem like the most foolish suggestion of all is that the animal is a malacopoda. Now who in the world would ever imagine that a malacopoda would go bothering around in this part of the country? Of all the animals of more or less wildness that this one is apt to be it may be positively stated that the malacopoda is the least apt, and people who have been brought up with a particular fear of the malacopoda instilled in their natures since earliest childhood are urged to have no further fear on this score.

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But with all of these out of the way the real identity of the wild animal which has brought on such a reign of terror among the people living in the vicinity of the northeast part of the city, remains as much of a mystery as ever and the people who have heard the noises made by the beast refuse to be convinced that they have simply "been hearing things" and insist that there is in reality some grounds for their fears.

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PASTY FOOD

Too Commonly Used.

The use of pasty cereals is not advisable. A physician says: "Pasty cereals are very indigestible and a bad thing for the stomach, causing a depressed feeling and quite a train of disorders, particularly of the intestines and nerves.

"Cereals, such as wheat and oats, can be cooked long enough and well enough to fit them for human use, but the ordinary way of cooking leaves them in a pasty condition."

An Indiana man says: "My physician prohibited the use of oats and

WORKING AT $1.50 A DAY

As Jurors While Paying Hired Hands $2 a Day.

The case of Riley Armbaugh vs. the board of Richland county commissioners et al, the proceeding to assess damages for the destruction of the more or less famous Campbell mill dam, southeast of the city, has been tried a second time and it is to be hoped that no error will be found in the proceedings this time, as it seems to cost the county more money in the way of damages when a new trial is had, to say nothing of the increased costs which are saddled on. Another thing about the matter is that the prosecuting attorney cannot get any extra fees these days for helping to try cases in which the county is interested. The attorneys for the landowner certainly had things coming their way at this second trial. In the first place they threatened to have a change of venue and have the case tried elsewhere. The result was that the jury was entirely composed of farmers, or men who are residents outside of the city. One man who had been a farmer, but who is now living at Bellville, was on the jury, but all the rest where almost pure farmers. This certainly made it a lop-sided jury in favor of the land-owner on the face of the proceedings. The jury got the case along about 3 o'clock in the afternoon. As they all wanted to get home that night, it was arranged to pay them off then and there before they retired to deliberate for the reason that when they got through with the case the treasurer's office would likely have been closed and they would not have been able to get their money. When the jurymen got their money there was a howl of large sized proportions. It seems that the law provides in this class of condemnation cases that the jurymen shall receive $1.50 per day, whereas the regular juryman gets $2 per day. The men kicked long and hard on account of the size of their checks. They stated that in the first place this is a very busy time of year for them. Some of them had harvest hands working for them at the rate of $2 per day, while they, the owners of the farms, were on the jury at Mansfield for four days at the rate of $1.50 per day. Although the jury men kicked pretty hard about the size of their stipends they got no more and were finally chased into a room where they deliberated two hours before returning a verdict. It was the first time a jury has been paid

A JOLLY TIME AMONG ELK

THEIR ANNUAL OUTING SOUTH PARK AND THE EVENING DANCE.

DAY AND EVENING OF PLEAS

All Sorts of Sporting Stunts, In
cluding Base Ball Game and Var
Races and Diversions—A Bal
the Elk Home at Night—Prog
of Events and the Various Winn

Although the day began with
and it seemed that the "clearing
was only temporary, the local
had a delightful day for their ou
on Friday, and despite the abs
from the city of many of the E
and the staying away of many
cause of the threatening weat
over two hundred members of
lodge, with their families and l
making a company of between
and 300, enjoyed the afternoon
South park after the most appr
fashion.

All of the committees had
good work to make the event a
cess and it was such in every res

The afternoon was spent in var
pastimes and sports, and about
m. supper was laid on long t
in the grove. And it was a good
per, too. Every Elk will testify
his wife is an expert in provi
good things to eat, and when the
certed efforts of all these ladies
spread on the festal board one
imagine the result.

Old Elks and young Elks
there. The men of families, the b
elor and their best girls, the te
rarily "bachelor hall" contingent
boys and girls, big and little, all
one happy family, were there and
testify that the event was an e
able one.

There was a long bill of sport
which prizes were awarded and t
contests aroused much exciteme
well as amusement, the complete
tails of which would fill more
means than the News has at its di
al, so that the programme, with
winners, must suffice. It was as
lows:

EVENT NO. 1.

Guessing Contest—
For Men—Prize, walking s
won by A. Tully Reynolds.
For ladies—Prize, set candel
won by Catherine Ford.

EVENT NO. 2.

Base Ball Game—
Winning team prize, box fin
gars, won by Jay Dirlam's nine.
Losing team, prize, nine fine
ums, won by H. W. Hartman's nir
Score 18 to 11, 6 innings.

EVENT NO. 3.

Running races—
Men under forty, 200 yds; p
pair suspenders, won by Jay Dir
Men over forty, 150 yds; s
stein, won by Jacob Rinehart.
(Jake says he's only 27).
For ladies, 60 yds, prize, silver
receiver, won by Martha Gibson.

EVENT NO. 4.

Stepping contest (blindfolded)
For men, 60 paces, prize, smo
set, won by L. Freundlich.
For ladies, 40 paces, prize, um
la, won by Mrs. Jacob Rinehart.

EVENT NO. 5.

Stake race—
For men, prize, necktie, won b
J. L. Stevens.
For ladies, prize, silver top po
box, won by Mrs. H. N. Redding.

EVENT NO. 6.

Lean men's race(fat men d
have enough to run)—
Prize, travelling flask, won b
W. Faust.

EVENT NO. 7.

Ball throwing contest—
Men's, prize, tobacco jar, wo
C. B. Umbnell.
Ladies, prize, card case, wo
Miss Martha Maxwell.

After the pleasurable after
and the supper at the park, the m
makers adjourned to the city a
the Elk home where the ev
was devoted to terpsichorean p
ures, cards and other diversions.

And prizes were awarded here
There were dancing contests and
any many couples put the best
forward, kept the judges busy t
cide upon the winners, but aw
were finally made as follows:

Waltz—
To gentleman, prize, pocket
Harland M. Wirth.
To lady, Miss Mary Small.
Two Step—
To lady, prize, tooth brush t
Mrs. J. J. McIntyre.
To gentleman, prize, pair su
ders, B. Burke Brown.
To couple appearing to best a
tage in the two step—

Mansfield News
Mansfield, ohio
8-17-1907

KINKAJOU IT MAY BE

SPECULATION STILL RIFE AS TO WHAT STRANGE ANIMAL MAY BE ROAMING.

IN THE VICINITY AROUND MANSFIELD

But the Noises It Makes, According To Veracious Witnesses, are Awe-Inspiring and Blood-Curdling—Thought to be Changing Its Base Of Operations to the Southeastern Section of the Township.

On the very face of it, it seems like the quintessence of absurdity to imagine for a minute that such an animal as the kinkajou could have wandered from its native heath and come into this county, in fact into this immediate vicinity, without having been detected and dispatched while it was on its way.

Yet many of the people who have been startled by the awe-inspiring noises which have seemed to emanate from the throat of some wild beast, which it is claimed, has been causing

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Table 1. Specimens used

Specimen	Age, years	Sex	Cranial capacity, cm³	Repository	ID	Diagnosis	Comments
1	14	M	667	UV	3795*	Secondary microcephaly	Associated with porencephalic, genu valgum, pes calcaneus, scoliosis
2	20–30	M	572	UV	5385	Microcephaly	Skull cast from early 20th century, detailed impressions endocranially
3			315	WU		Microcephaly	
4	10	M	276	AMNH2792a		Primary microcephaly	Skull cast; individual lived in Germany, late 19th century
5	Sub-adult	F	554	PMHU	7200*	Microcephaly	From Peru
6	Adult	M	422	PMHU	7387*	Microcephaly	From Mauritius, African features,
7	Nearly adult	F	504	NMNH	379510*	Microcephaly	From Peru (Chilca)
8	Adult	F	505	UM	96-11-128A	Microcephaly	
9	Adult	M	671	UM	660	Microcephaly	
	32	F	358	FMNH		Microcephaly	Basuto woman, South Africa
	30	F	417	INCA	LB1		*H. floresiensis*
1	25	F	1,138	WU	66-10	Normal human	
2	20–30	M	1,270	FSU	20-30	Normal human	Caucasian
3	40	F	1,132	WU	78-8	Normal human	
4	40	M	1,053	WU	67-11	Normal human	
5	20–30	M	1,263	FSU	C20-C30	Normal human	Caucasian
6	18–25	M	1,260	FSU	C18-C25	Normal human	Caucasian
7	45+	F	1,381	FSU	OBF	Normal human	Black
8	45+	F	1,445	FSU	OFU	Normal human	
9	18–25	F	1,124	FSU	PAAF	Normal human	Probably African-American
10	45+	F	1,142	FSU	001	Normal human	Probably African-American
	20	F	752	UPM	1190*	Dwarf	3 ft tall; Tubingen, Germany

*CT data provided directly; other specimens scanned at Barnes Jewish Hospital, St. Louis. AMNH, Amercian Museum of Natural History; FMNH, Field Museum of Natural History; FSU, Florida State University Department of Anthropology; INCA, Indonesian National Centre for Archaeology, Jakarta; NMNH, National Museum of Natural History (Smithsonian); PMHU, Peabody Museum of Archaeology and Ethnology, Harvard University; UM, University of Michigan Department of Anthropology; UPM, University of Pennsylvania Museum of Archaeology and Anthropology; UV, Museum of Pathology and Anatomy, University of Vienna; WU, Washington University School of Medicine. Data for microcephalics (M) and normal humans (NH) from authors and G. Conroy, Washington University School of Medicine (M#3); K. Mowbray, American Museum of Natural History (M #4); D. Lieberman, Harvard University, M. Morgan and J. Brown, Peabody Museum (M #5–6); Bruno Frohlich and D. Ubelaker, National Museum of Natural History (Smithsonian Institution) (M #7); Milford Wolpoff, University of Michigan (M #8–9); G. Doran and Colette Berbesque, Florida State University (NH #2, 5–10); and Janet Monge, University of Pennsylvania Museum (dwarf). R. Martin provided the endocast of the Basuto woman, upon which we performed a computed tomographic scan.

shape of its orbital surface (Fig. 1 and SI Fig. 6); the endocast of the Basuto (Lesotho) woman that is supposed to resemble LB1 (4, 31) does not (Fig. 1). We are pleased to have obtained a copy of this microcephalic endocast that was described by Martin *et al.* (4, 31) but were unsuccessful at our repeated efforts to obtain information about the repository and specimen number of the key microcephalic endocast that was alleged to be nearly identical to LB1's by Weber *et al.* (2) or, more importantly, to obtain

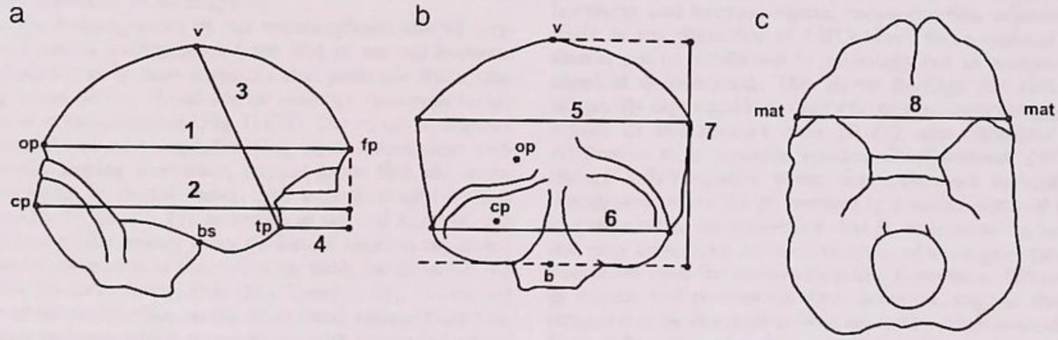

Fig. 2. Key for right lateral (*a*), posterior (*b*), and inferior (*c*) views of endocasts. Measurements (3, a chord; others projected): (*a*) 1, cerebral length (fp-op), 2, cerebellar pole-projected frontal pole; 3, anterior cerebral height (chord v-tp); 4, temporal pole-projected frontal pole; (*b*) 5, cerebral width (right and left points that define maximum projected width); 6, cerebellar width (right and left most lateral points on cerebellum, includes sigmoid sinus if visible in posterior view); 7, endocast height (v-b); (*c*) 8, frontal breadth (mat-mat). Landmarks: b, midpoint on line tangent to the base of cerebellum; bs, intersection of right brainstem with right temporal lobe; cp, most caudal point on the cerebellum in lateral view (may be on either side); fp, most rostral point on the frontal lobes in lateral view (may be on either side); mat, in basal view, point at lateral edge of endocast located at level of the most anterior point of the temporal lobe; op, most caudal point on occipital lobes in lateral view (may be on either side); tp, most rostral point on temporal lobes in lateral view (may be on either side); v, vertex. Four indices used in discriminant and canonical analyses: cerebellar protrusion = 2/1; relative length posterior base = (2–4)/1; relative cerebellar width = 6/5; relative frontal breadth = 8/6.

LOOKS LIKE A "TAGGER."

cold chills to run up and down the spinal column of the residents of the vicinity just northeast of the city, have reached such a degree of nervousness that they would not be greatly surprised if a kinkajou of the very fiercest kind would suddenly spring upon them.

The mere idea of there being an animal of this kind in this section of the country is enough to cause anyone to gasp with fear but the danger is not particularly imminent in view of the fact that even A. J. Baughman fails to remember ever having seen an animal of that sort in this section of the county or in the vicinity of Bellville.

Equally improbable is the assertion of some others that the animal in question is nothing more or less than a loplomys, and it is hard to see why people should make assertions of this kind or even give credence to a story that there is any kind of an unusual animal running around so near to a thickly populated community as this is.

But even at that, it is a little hard to doubt the reliability of so many veracious citizens as claim to have

IT MAY COME TO THIS.

heard the roaring, snarling, whining beast gallivanting around while they were on their way home, or rousing them from their slumbers by seeming to come into their very dooryard.

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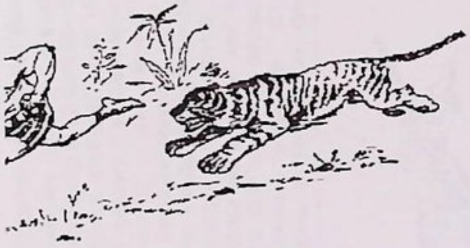
foolish suggestion of all is that the animal is a malacopoda. Now who in the world would ever imagine that a malacopoda would go bothering around in this part of the country? Of all the animals of more or less wildness that this one is apt to be it may be positively stated that the malacopoda is the least apt, and people who have been brought up with a particular fear of the malacopoda instilled in their natures since earliest childhood are urged to have no further fear on this score.

And in the same manner there would appear to be no particular reason why the koala, the nyula, the cacomixle, the rhinolophid and the pterodactyl should not also be dismissed with a mere mention.

But with all of these out of the way the real identity of the wild animal which has brought on such a reign of terror among the people living in the vicinity of the northeast part of the city, remains as much of a mystery as ever and the people who have heard the noises made by the beast refuse to be convinced that they have simply "been hearing things" and insist that there is in reality some grounds for their fears.

Thus far, however, the animal—if there really is an animal—has been sufficiently crafty to avoid all of the many hunters who have been on the lookout for it and seems to have kept itself concealed in some of the nearby woods during the day, only venturing out after nightfall in order to satisfy its appetite and it would appear that on these noctural visits its devotes practically all of its attention to the chicken roosts and a number of the residents of the section infested can attest its fondness for a poultry diet by a noticeable shortage in their chicken population.

There was an unauthenticated report floating about Saturday that sounds not unlike those produced by the animal which is supposed to be making its headquarters northeast of the city, had been heard by people passing along the road southeast of town and it was thought possible that this same mysterious beast had sought a new pasture, but the information at hand is too vague to carry much weight.



LOOKS LIKE A "TAGGER."

WORKING AT $1.50 A DAY

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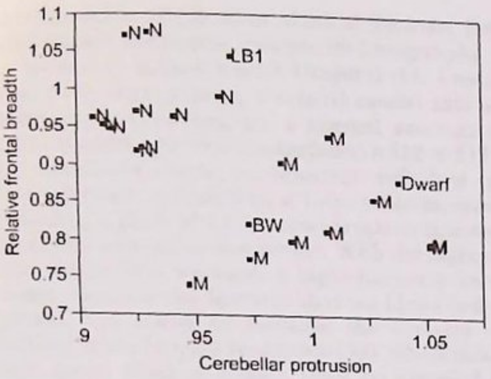


Fig. 3. Scatter plot of relative frontal breadth on cerebellar protrusion. The legend of Fig. 2 contains a description of the measurements that were used to create the ratios. Discriminant analysis demonstrated that these two variables classified microcephalics (M) and normal humans (N) with 100% success. The dwarf, Basuto woman (BW), and LB1, which were not used to develop the classification functions, were classified, respectively, as two microcephalics and a normal human.

a copy or computed tomographic (CT) scan of the endocast so that we might include it in the present analysis.

Our analysis of the virtual endocast of 10-year-old microcephalic Jakob Moegele has been criticized because we performed a computed tomographic scan of a cast whose parts (the calotte and base) were different colors and chemical compositions (4, 31). Despite the skull's calotte and base having been cast separately, the CT data produced a seamless virtual endocast (Fig. 1 and SI Fig. 6) with a volume of 276 cm^3, which is very close to the 272 cm^3 initially reported (32). Indeed, figure 3 of Martin *et al.* (31) reveals the similarity in the shape of the original skull and the cast that we scanned, and shape rather than color of the cast parts is the salient feature in our analyses. Because primary microcephalics are believed to achieve their maximum cranial capacities by around four years of age (27), there is no reason to exclude a 10-year-old microcephalic from our analysis. As noted, the added variation in age and cranial capacity increases the diversity of our sample, which makes it more likely that it captures general traits of microcephalics. The most compelling reason for including Jakob Moegele's virtual endocast in our sample, however, is because our analyses show that it classifies with the other microcephalics in all respects.

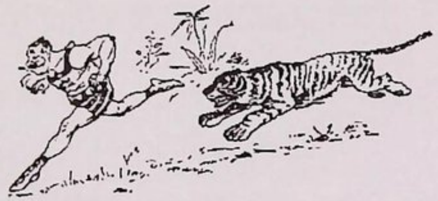
Despite the heterogeneity of our microcephalic sample, certain shape features distinguish it from that of normal humans: Microcephalics usually have cerebella that protrude more caudally (Fig. 1 and SI Fig. 4) and appear disproportionately larger than those of normal humans (Fig. 1) (27). The relatively smaller frontal breadths of microcephalics (Fig. 3) are consistent with their typically sloping foreheads, frontal lobes that are more pointed rostrally in dorsal views, and hypothetically smaller forebrains (15, 21, 26, 27, 29). In brains of normal humans, the orbital surface of the frontal lobes (in lateral view) is expanded due to ventral protrusion of the cortex medially (underneath the paths of the olfactory tracts) (33) (Fig. 1 and SI Fig. 4). Virtual endocasts of microcephalics, on the other hand, appear flatter on their orbital surfaces, which is consistent with images of actual brains (21, 29), even when the sulci and gyri appear superficially normal (SI Fig. 4). The indices that describe cerebellar protrusion and relative frontal breadth, which together perfectly sort our sample of microcephalics from normal humans, represent traits that are visually apparent and in keeping with descriptions of microcephalics in the clinical literature. Because our classification functions sort together microcephalic endocasts that range in size from 276–671 cm^3, our shape analyses are not constrained by allometric scaling. (The question of whether microcephalic brains scale allometrically in other ways is beyond the scope of this paper but could be addressed in future studies using 3D geometric morphometrics.)

Two genes that cause microcephaly when mutated (SI Table 2) are hypothesized to have been under pronounced natural selection in the last common ancestor of apes (microcephalin, MCPH1) and in hominins (ASPM, MCPH5) in conjunction with increasing brain size (11, 12, 15) although their precise correlation with phylogenetic increases in this trait has been questioned (25). Our findings are consistent with the hypothesis that genes associated with primary microcephaly may have had a role in primate brain evolution and, more specifically, that some brain dimensions in primary microcephalics resemble those of early hominins (12). Endocasts of an early hominin genus, *Paranthropus*, that is not believed to have been directly ancestral to humans retained an apelike shape of the orbital rostrum (in lateral views) and pointed frontal lobes (in dorsal views) (33) similar to endocasts of primary microcephalics (Fig. 1 and SI Fig. 4). Between 2.5 and 3.0 million years ago, a derived ventrally expanded orbital surface and squared-off frontal lobes (in dorsal view) appeared in another species that may have been directly ancestral to humans, *Australopithecus africanus* (33). These converging data raise the interesting possibility that genes involved in primary microcephaly (e.g., ASPM) may have been important for the evolution of the shape and internal organization of the orbitofrontal cortex in addition to their effects on brain size.

A study that concluded LB1 is a microcephalic pygmy *H. sapiens* rather than a new species of hominin (7) provided no measurements of the neurocranium. This study is refuted not only by our findings but also by an investigation of LB1's affinities using cranial and postcranial metric and non-metric analyses that included comparisons with pygmies from Africa and Andaman Islanders as well as a "pygmoid" excavated from another cave on Flores (34). As shown here, the frontal breadth relative to cerebellar width and lack of cerebellar protrusion of LB1's endocast classify it with 100% probability with normal *H. sapiens* rather than microcephalics. The relative length of its orbital surface also sorts LB1 with *H. sapiens* (1). On the other hand, LB1's endocast shows affinities with *Homo erectus* in its relative height, disparity between its maximum and frontal breadths, relative widths of its caudal and ventral surfaces and long, low lateral profile (1). Its tiny cranial capacity, relative brain size, and derived ventrally expanded orbital surface, however, show affinities with *Australopithecus africanus* (33). Because subsets of LB1's features occur normally in other hominins and because virtual reconstruction adjusted for the slight *in situ* distortion of LB1's skull, these endocast features should not be attributed to pathology nor to postmortem mechanical deformation. The above findings for LB1, plus its bilaterally expanded but otherwise normal-appearing gyri in the region of Brodmann's area 10 (1), are consistent with its attribution to a separate species, *H. floresiensis* (35–37). Although LB1's relative brain size seems not to scale on the ontogenetic curve for *H. erectus* (1), a recent study of brain size in *Pongo* raises the possibility that *H. floresiensis* ' relative brain size may have been reduced because of ecological factors (38), consistent with the insular-dwarfing hypothesis. Other analyses of cranial and postcranial data, however, suggest that *H. floresiensis* may be descended from an earlier small-bodied hominin from either *Australopithecus* or *Homo* (34).

Materials and Methods

CT scans of 5 microcephalic skulls, 1 microcephalic endocast, and 10 normal human skulls (Table 1) were performed at Washington University School of Medicine. The CT scan parameters (and reconstruction kernel) were chosen to produce optimal reconstructions. Our material was scanned with



LOOKS LIKE A "TAGGER."

imagine for a minute that such an animal as the kinkajou could have wandered from its native heath and come into this county, in fact into this immediate vicinity, without having been detected and dispatched while it was on its way.

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reality some grounds for their fears.

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and the staying away of many because of the threatening weather, over two hundred members of the lodge, with their families and ladies making a company of between 400 and 500, enjoyed the afternoon at South park after the most approved fashion.

All of the committees had done good work to make the event a success and it was such in every respect.

The afternoon was spent in various pastimes and sports, and about 6 p. m. supper was laid on long tables in the grove. And it was a good supper, too. Every Elk will testify that his wife is an expert in providing good things to eat, and when the concerted efforts of all these ladies are spread on the festal board one can imagine the result.

Old Elks and young Elks were there. The men of families, the bachelor and their best girls, the temporarily "bachelor hall" contingent, the boys and girls, big and little, all like one happy family, were there and can testify that the event was an enjoyable one.

There was a long bill of sports for

final one before there is a general meeting for the preparation of the report that must be made to the governor. The members have discovered a wide diversity of view as to what the laws should be with a view to listing all of the property and at the same time secure a fair and equitable rate. Under the wording of the resolution providing for the appointment of the commission, the report is to go to the governor, and the bill to follow will be built along the line of the recommendations of the body.

The anti-saloon league has begun its campaign for the enactment of the Rose county local option bill, that now sleeps with the senate committee on temperance. In spite of the fact that at the recent meeting of the members of the assembly at Cedar Point, where the feeling appeared to be against the enactment of such a law at this time, it is understood that the league is working through its many powerful agencies to secure votes for the bill. In some cases members who are serving their first terms in the senate and house have been threatened with the vengeance

Celebrates Sixty-Fifth Anniversary

John DeBo, in celebrating his sixty-fifth birthday anniversary yesterday, entertained 20 guests, who came from Hueneme, Los Angeles, Long Beach and Oxnard to take part in the festivities and dinner, observing his anniversary and Thanksgiving Day.

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Entertain Thanksgiving Day

Mr. and Mrs. A. B. Rodaway entertained Thanksgiving day, and at dinner, their guests being H. P. Stadtmiller of Exeter, Mr. and Mrs. Henry Grimm and family and Mr. and Mrs. Charles E. Rodaway and son, Alfred.

The young of many species of birds migrate south before their parents and make the journey without any memory of the route to guide them.

A heavy surf along oceanic shores causes vibrations in the earth that are registered by seismographs hundreds of miles inland.

the past month is now improving.

MYSTERIOUS BEAST REPORTED BY BRITON

ALLAHABAD, India, Nov. 27.—A description of a strange creature with a body like a crocodile, but with a head the size and shape of an American basketball, which he encountered in a shooting expedition in the Sunderbunds in Bengal, comes from a British Army officer, who has just arrived here.

"Accompanied by a shikari and my sikh orderly, I had been following the track of a tiger and tigers for some hours," he says, "and after a crawl through the thick grass we had finally got near the couple which were busily engaged in devouring a large boar, but by the time I had crawled forward and was able to see into the recess

Suit or Overcoat

at $40.00 to $50.00

to the smaller items which find a ready place in every man's wardrobe.

from $1 to $10

Neckwear
Beltogram
Handkerchiefs
Silk Shirts
Silk Hosiery
Purses
Umbrellas
Slippers
Sweaters
Golf Hose
Belts
Cuff Links
Golf Knickers
Tuxedo Vests
Gloves

Do Your Christmas Shopping Early

Albert C. Diener

FOR SMART MEN'S WEAR

Oxnard Daily Courier
Oxnard, CA 11-27-1925

a Siemens Sensation 64 (Siemens Medical Systems, Erlangen, Germany) clinical multislice, computed-tomography (MCT) scanner, located in Barnes Jewish Hospital (St. Louis, MO). Specimens were aligned along a cranial-caudal axis with the nose facing upward, to simulate a normal anatomical head orientation. Scanning parameters included a 512 × 512 matrix, 120 kVp, 300 effective mAs, 32 detectors with dual sampling to achieve a 0.6-mm collimation, a 1-sec table increment per gantry rotation, a pitch of 0.8, a reconstruction interval of 0.5 mm, and a H50s reconstruction kernel. With the higher-depth-resolution images that we used, a high-sharpness kernel was unnecessary. Because the features that we identified crossed many planes, our ability to visualize the features was not compromised by the Nyquist frequency (39), which dictates the resolution above which a feature must be sampled to fully reconstruct the feature. All data were archived to compact disk in DICOM format and transferred to a stand-alone workstation for processing. By using commercially available software packages, Mimics 8.11 (Materialise, Ann Arbor, MI) and Analyze 6.1 (Biomedical Imaging Resource, Mayo Clinic, Rochester, MN), the CT image data were visually assessed and inspected for artifacts and damaged areas. CT scans of four additional microcephalic skulls were provided by the Museum of Pathology and Anatomy, University of Vienna (one); Harvard Peabody (two); and the Smithsonian (one) (Table 1). These scans were performed by using our parameters. CT data for a "female dwarf" were also provided by the University of Pennsylvania Museum. CT scans of LB1 were performed by using a Siemens Emotion CT scanner in Jakarta and analyzed at the Mallinckrodt Institute of Radiology (1).

Virtual endocasts of all specimens were made by using Mimics 8.11. This software provides tools to convert grayscale CT image data into a wireframe "virtual" model. First, the skull is segmented (isolated) from surrounding air and labeled by using a combination of global and local thresholding operations together with a region growing operation. The internal braincase was enclosed, using manual segmentation, to close any contour gaps in the skull, such as at the eye sockets. Once the internal braincase was fully enclosed, as would be done making a traditional latex endocast, the virtual endocast object was defined with a cavity fill operation, and a 3D object was created within the Mimics 3D Object module. This was done by using the high-quality option. By means of the edge extraction tools within the Mimics STL module, a triangulated surface definition was created from the endocast 3D object.

Shape comparisons were performed between the endocasts by using Geomagic Studio 5 software (Raindrop Geomagic, Research Triangle Park, NC).

Each virtual endocast was aligned in dorsal view, and markers were placed on its most rostral frontal pole (fp) and most caudal occipital pole (op). The endocast was then rotated to the right lateral view and a line placed to connect the two markers; the line was rotated to a horizontal position (Fig. 2*A*). The projected fp–op distance in lateral view was measured to obtain cerebral length (measurement 1). In the right lateral view, markers were placed on the vertex (v) and most caudal cerebellar pole (cp). These placements were checked with dorsal and posterior views. In right lateral view, markers were placed on the more rostrally projecting temporal lobe at the middle of its curvature (tp), and the intersection of the right side of the brainstem with the right temporal lobe (bs). Anterior cerebral height (measurement 3) was measured as the direct distance (chord) from vertex to tp; and shortest projected distances were measured from cp and tp to the vertical line tangent to fp (cerebellar pole-projected frontal pole, measurement 2; temporal pole-projected frontal pole, measurement 4). The endocast was then rotated to occipital view (Fig. 2*B*), and markers were added at the most projecting points laterally on both hemispheres of the cerebrum and at the most laterally projecting points of the cerebellum (at the outside edges of the sigmoid sinuses, if visible). These markers were used to measure the projected maximum widths of the cerebrum (cerebral width, measurement 5) and cerebellum (cerebellar width, measurement 6). Endocast height (measurement 7) was measured as the shortest projected distance from vertex to the line tangent to the base of the cerebellum. Frontal breath (measurement 8) was measured at the mean level of the most rostral points on the two temporal poles in basilar view (Fig. 2*C*).

Three months after the baseline measurements were made by K.S. and D.F., all identifying features were removed from the three-dimensional computed tomographic images of the 9 microcephalics and 10 humans and one observer (K.S.) repeated all measurements (T2). Bland-and-Altman plots were used to assess measurement reliability, along with plots of baseline (T1) and repeat (T2) measurements for the microcephalics and normal humans (40). Variance components analyses were used to determine the percentages of variation attributable to subjects and time (baseline and repeated measurements). Measurements of the Basuto woman (8) were made (by K.S.) at the time that repeat measurements were made. Repeatability (reliability) analyses were performed with JMP Statistical Software Release 5.0.1 (SAS Institute, Cary, NC) and MedCalc Statistics for Biomedical Research Version 8.1.0.0 (MedCalc Software, Mariakerke, Belgium). Measurement repeatability was high, with >99% of measurement variability being attributable to subjects (see SI Figs. 7–14).

Discriminant and canonical analyses were used to study shape differences between virtual endocasts of microcephalic humans ($n = 9$) and normal humans ($n = 10$). For these analyses, we used the four ratios that we thought would discriminate between the two groups (2/1, [2–4]/1, 6/5, and 8/6) (Fig. 2). Data were tested for normality with Shapiro–Wilk W tests, and the homogeneity of the variances and covariances was tested with a Box M test. Backward stepwise discriminant analysis was used to select the most powerful discriminators (SI Table 4). For the stepwise procedure, the F to enter was set at 4; F to leave was set at 3; and the tolerance was set at 0.01. Each discriminator plus the combination of the most powerful discriminators was used to classify each case into the group that it most closely resembled. In addition, LB1, the Basuto woman, and a human dwarf (which were not used to develop the discriminant and classification functions) were classified into the two groups. Posterior classification of cases was based on Mahalanobis distances, with *a priori* probabilities being proportional to group sample sizes. Data analyses were performed with JMP Statistical Software Release 5.0.1.2 and STATISTICA (data analysis software system, Version 7.1; StatSoft, Tulsa, OK). Scatter plots for the four variables that were analyzed are presented in SI Fig. 5. The data were normally distributed (Shapiro–Wilk W test, $P > 0.05$), and the variances and covariances were homogeneous across groups (Box M test, $P > 0.05$).

We are deeply grateful to G. Conroy (Washington University School of Medicine), D. Chernoff (Saratoga Imaging), A. Fobbs (National Museum of Health and Medicine), B. Frohlich and D. Ubelaker (National Museum of Natural History, Smithsonian Institution), G. Doran and C. Berbesque (Florida State University), M. N. Haidle (Institute for Prehistory and Early History and Archaeology of the Middle Ages, Tuebingen), M. Hofman (Netherlands Institute for Brain Research), D. Lieberman (Harvard University), R. Martin (Field Museum of Natural History), J. Monge (University of Pennsylvania Museum), M. Morgan and J. Brown (Peabody Museum), K. Mowbray (American Museum of Natural History), L. Sobin (Armed Forces Institute of Pathology), F. Spoor (University College London),

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Minstrel Show

A real old-fashioned minstrel show, with lots of fun, new jokes and new music will be given by the Young Men's club of Camarillo, at the Pleasant Valley schoolhouse tomorrow night. The public is invited.

◆ ◆

Six O'clock Dinner

Mr. and Mrs. Allan Burleson had as guests to share their Thanksgiving turkey and the delicacies that went with the bird, Mrs. Ella Fitzpatrick and her daughter, Miss Olga.

◆ ◆

Dine at Lebec Lodge

Mr. and Mrs. James Cerny, Miss Irene Nesom, yesterday motored to Lebec where they were joined by Mr. and Mrs. Edward Cerny of Visalia, and the party dined at Lebec lodge, at the foot of the Ridge route.

◆ ◆

Attend Football Game

Roy Gill, Alfred Gill, Louis Braham,

News Notes of People In and About Saticoy

SATICOY, Nov. 27.—Mrs. Myron Gill attended the W. B. A. carnival on Thursday evening.

Jas. Flenning, of Oklahoma, father of Mrs. Bert Coy, who has been visiting in Saticoy for the past week, has returned to Los Angeles and Alhambra where he will visit with other children for awhile.

Joe Milich has moved into the new home he recently purchased.

Will Dickenson spent Saturday evening in Santa Paula.

Mrs. A. Rye of Ventura called on Mrs. Charles Lauber on Thursday morning.

James A. Serey spent Sunday with his friend, Chester Adams of Ojai.

Mrs. Harry Hubbell and two sons are spending the week in Los Angeles.

where the kill lay, both tiger and tigress had disappeared.

"I was loath to give up the hope of still getting a shot, and I therefore took up my position in some thick bushes from which while concealed, I could view the kill about ten yards away, thinking that the pair might return to finish the repast.

I had been there for about an hour when out of the water-course a strange looking animal appeared. The creature was about 10 feet long, and had a body very like a crocodile, but instead of the ordinary crocodile head it had one about the size of a Rugby football, though rather flatter, with a comparatively slender neck about two feet long.

"It made straight for the dead pig and started eating it. Shortly after another appeared and soon there were at least a dozen around the carcass. They varied in length from 12 to five or six feet, and all had the same shaped heads, which they constantly raised on their long necks as they quarrelled with each other over their meal."

The strange creatures described by the army officer are said to be unknown to naturalists.

Shears for cutting cloth were invented in Italy about 400 B. C., but it was two or three centuries later before scissors were made by fitting them to the fingers.

CHEST COLDS
Apply over throat and chest
—cover with hot flannel cloth
VICKS
VAPORUB
Over 17 Million Jars Used Yearly

This Men's Store Is

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Autopsy on Anna Nicole Smith to be performed Friday

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Anna Nicole Smith dies at 39

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◻ LATEST NEWS

- Autism affects one in 150 US children, new study says
- Space station astronauts start 3rd spacewalk in 9 days
- NASA investigating problems on latest Mars orbiter
- Archeologists find two prehistoric human skeletons buried in romantic embrace
- Explorers find over 100 fossilized dinosaur eggs in India
- Suni Williams sets new record for longest spacewalk - over 22 hours
- Debate rages in Kenya as evangelicals try to keep ancient skeleton in the closet
- Sea bird involved in US logging battles declining in Alaska
- Rare mollusk and crustacean species discovered in Philippines
- 'Love Story' actor Ryan O'Neal accused of assaulting adult son in Malibu

◻ NEWS OF THE WEEK

- Deadliest fire in Russia, in over 3 years kills 45 women
- Robert Gates pessimistic about Iraq saying US not winning war
- The USA executes its citizens every 10 days

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- Article

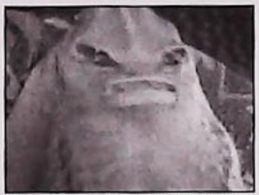
Russian fishermen catch squeaking alien and eat it

Front page / Science / Mysteries

07.02.2007 ◻ **Source:**

Village residents from the Rostov region of Russia caught a weird creature two weeks ago after a strong storm in the Sea of Azov. The shark-looking creature was producing strange squeaky sounds. The fishermen originally believed that they had caught an alien and decided to film the monster with the help of a cell phone camera. The footage clearly shows the creatures' head, body and long tail. The bizarre catch was weighing almost 100 kilograms, the *Komsomolskaya Pravda* reports.

However, ufologists and scientists were greatly disappointed when they found out that the fishermen had eaten the monster. They said that they were not scared of the creature so they decided to use it as food. One of the men said that it was the most delicious dish he had ever eaten.


Russian fishermen catch alien monster

Click here to see the video of the alien sea monster

Chairman of the Anomalous Phenomena Service, Andrei Gorodovoi, stated that the creature, which he could see on the short video, was an anomalous being. However, it could hardly be described as an extraterrestrial form of life, he added. Gorodovoi rejected the version about mermaids too. "There are many legends about mermaids living in the Sea of Azov. Nevertheless, specialists of the Service for Anomalous Phenomena have never confirmed those fairytales. On the other hand, we do not deny the possibility of other forms of life in the Sea of Azov," the ufologist sad.

◻ BREAKING NEWS

- North Korea will never give up its nuclear program
- U.S. friendly fire kills more and more innocent people
- Astronaut love triangle leads to kidnapping attempt

Girls from TATU like turning people on
More...

A spokesman for the Rostov-based zoo, Alexander Lipkovich, contacted local ichthyologists and asked their opinion about the Azov alien. "They said that the fish bears resemblance to a sturgeon. It was an extremely interesting individual. I have never seen anything like this before in my whole life," the specialist said.

Translated by Dmitry Sudakov
Pravda.ru

print version e-mail

◻ Readers' Top

Russian fishermen catch squeaking alien and eat it (pic, video)

Nudism endangers human potency and health

Mummified man found in his apartment sitting down for 6 years

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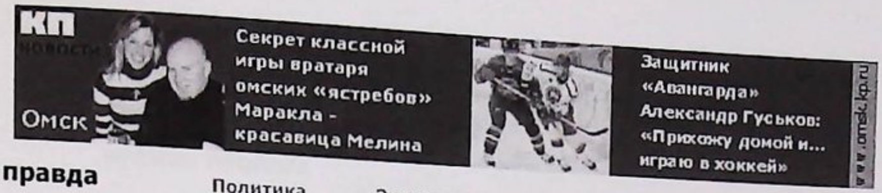
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Общество | **КЛУБ ЛЮБОЗНАТЕЛЬНЫХ** [07 февраля 2007]

Из Азовского моря выловили инопланетянина? [ВИДЕО]

Чудо-рыбина странно блестела и жалобно пищала

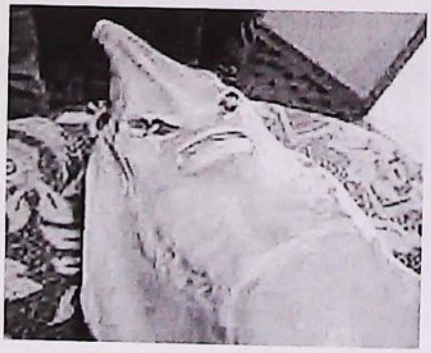
В редакцию «КП» обратилась жительница Азова Ростовской области Ольга Куркина:

- Может, вы разберетесь, что за чудо выловили рыбаки?

Две недели назад после сильного шторма мужики села Семибалки сетью вытащили на берег двухметровое чудище, похожее на акулу. Тварь странно пищала и вращала глазами.

- Неужто инопланетянин? - чесали затылки селяне. И засняли необычный улов на мобильный телефон. Вскоре об азовском «инопланетянине» стало известно всей округе, пошла гулять съемка по рукам. Хорошо видны голова, тело и длинный хвост. Туловище сильно блестит, похоже, что смазано чем-то жирным или воском. Весом оно оказалось под сотню килограммов.

К большой скорби ученых и уфологов, азовские рыбаки странного вида чудо-рыбы не испугались и... слопали. Говорят, что ничего вкуснее в жизни не пробовали.



Популярные фильмы
Вавилон
Париж, я люблю тебя
Престиж
Новый трейлер
7 кабинок

Расписание кино на сегодня _

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Tincher (Barnes Jewish Hospital, St. Louis), R. Wilkinson (Skidmore College), and M. Wolpoff and T. Schoenemann (University of Michigan). This work was supported by National Geographic Society Grants 7769-04 and 7897-05. Acquisition of CT data in Vienna was supported by Austrian Federal Ministry for Culture Science and Education Grant GZ 200.093/I.VI/I/2004.

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Такого монстра выудили азовские рыбаки. Фото с мобильного телефона.

МНЕНИЕ УФОЛОГА

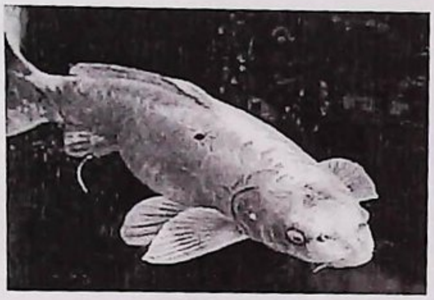
Андрей ГОРОДОВОЙ, руководитель службы аномальных явлений, Азов: А может, это русалка?

- Легенды о русалках в Азовском море существуют давно, но ни разу не были подтверждены специалистами службы аномальных явлений. Хотя мы вовсе не отрицаем существования иных форм разума в Азовском море.

КОММЕНТАРИЙ СПЕЦИАЛИСТА

Александр ЛИПКОВИЧ, зам. директора зоопарка, Ростов: Похоже на осетра, но...

- Посоветовался с нашими ихтиологами, говорят, что рыба похожа на осетра. Но это очень интересный экземпляр! Ничего подобного в жизни не видел.



А этот карп-гуманоид обитал в водоемах Кореи.

КСТАТИ

Карп с человеческим лицом

В 2005 году агентство Reuters сообщило, что в частном пруду, находящемся в 140 километрах к югу от Сеула, в городе Чонджу, живет карп длиной 80 сантиметров с лицом, как у человека. Живет давно - уже лет 20. Эксперты, правда, отмечают, что человеческие черты образованы ноздрями рыбы и чешуей.

Ирина ЛЕНЕВСКАЯ («КП» - Ростов-на-Дону»)

А что вы думаете? Комментариев: 44 Версия для печати

Слышать можно не только ушами! Технологии будущего>>

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Звезда российского кино скончалась

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Оргии Маршала и "блестящей"...
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Муж Алсу ушел к Собчак...
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Как гуляют звезды на корпоративных новогодних вечеринках...
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Невероятно сексуальные наряды "ВиаГры"...
redtram.ru

Пугачева вышла замуж за Галкина...
redtram.ru

Шара
заста
одеть
sovspo

Лоли
вышл
сцену
одеж

Жанн
Фрис
разби
губу
прям
время концерта
redtram.ru

Булан
измен
муж
Певиц
устав
от...redtram.ru

ЖИЗНЬ

Алла Пугачева вновь выходит замуж...
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"ВИА Гра" соблазнила подростка...
dni.ru

Малиновская сломала палец ребенку...
mail.ru

Как Николай Басков домогался своей жены на глазах у всех! (Фото)...
redtram.ru

Певца Мурата Насырова предали...
dni.ru

Киркоров тайно обручился
Его

Волочкова устроила эротическ
шоу на курорте ФОТО...
redtram.ru

Валерия замалчива
скандал...
dni.ru

Самые сексуальн
женщины шоу-бизнеса 2006. Фото...
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актер
ную

Новотека

- Sex-танцы Собчак
- В России родился мальчик с четырьмя глазами (фото)
- Гурченко теряет лицо.ФОТО
- Группа «Фабрика» сменила состав
- Тайна гибели внука Гурченко
- Френкель был тайно «женат» на мужчине
- Разоблачение филиппинских хилеров: как делаются операции без скальпеля (ФОТО)

al value of £2,000,000 sterling.

A Monster of the Deep.

We had a view yesterday, of a creature, taken about a month since, in St Lucia Sound, East Florida, called a Sea Cow—This singular creature is about ten feet in length, and some eight or nine feet girth at the largest part of the body—has a broad, fan shaped fin or tail, and two flippers or paws, somewhat similar to a turtle, but with more points Its head is peculiarly formed, having nostrils and lips resembling a cow. It was brought to this city in the schooner Charleston, and is intended to be taken to New York at the trip of the steamer Osprey. It is contained in a large box, filled with salt water, and appears to be healthy and lively During the passage heavy weather prevented supplying the box with water, and it remained without it from 2 A. M o'clock at night. At the time of capture of this creature, its female mate, of greater bulk was taken in a seine, but so fiercely resisted, that it became necessary to kill it The meat presented, the appearance of ordinary beef —*Charleston Courier*

---

hauled alongside of the dock at Hall's ware house, where she now lies aground We have not ascertained the extent of the injury, but it is thought that her hull is not injured to any extent She was proceeding to the upper Lakes to resume her trips in the Chicago and Green bay trade

Outside, the night was clear, and both lights were distinctly seen—it is claimed that the propeller was out of her way, and to this circumstance is attributed the collision The injury to the propeller was very slight, and after effecting the landing of the passengers of the Lexington, she proceeded direct to Buffalo—*Conneaut Republican*

Railroad Accident.

The particulars of the falling of the bridge at Lackawaxen, on the Erie Rail Road, are most distressing. The bridge was of iron, measuring about 60 feet The locomotive passed safely, but nothing more Fifteen freight cars were precipitated into the ravine, about 25 feet, and broken and piled up in a most frightful manner In the train were 113 head of Cattle, 430 sheep, and

---

a host of friends and conducted to the American Hotel, and made a speech

New York Aug 6.

In addition to the fall of the building yesterday in Spruce street another similar accident happened in Mercer street, where the workmen were employed Nine were buried in the ruins Cassidy and three others were killed

Missouri Election.

Cape Girardeau, 6th, 6 P M

Polls closed vote as follows. Darby 171, Rozier 111, Bowlin [illegible] Legislature, Watkins, Whig, 425, T M Hurd, Whig, 16[illegible], Burnett, Benton, 10[illegible], Anti Benton candidate, 78

St Louis Aug 7th

Returns come in slowly, but little doubt exists that the whole Whig ticket for the city and county is elected

Darby, Whig candidate in the first district, is likewise believed to be elected

Interment in the last 24 hours 27 of which

THE said D[illegible] [illegible] said Com[illegible] [illegible] said Court on the 27th [illegible] forth that they are assignees [illegible] 1817 [illegible] sixty days [illegible] said Court the said Com[illegible]

Elyria Courier
Elyria, Ohio
8-13-1850

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Spot the match – wildlife photo-identification using information theory

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Abstract

Background: Effective approaches for the management and conservation of wildlife populations require a sound knowledge of population demographics, and this is often only possible through mark-recapture studies. We applied an automated spot-recognition program (I^3S) for matching natural markings of wildlife that is based on a novel information-theoretic approach to incorporate matching uncertainty. Using a photo-identification database of whale sharks (*Rhincodon typus*) as an example case, the information criterion (IC) algorithm we developed resulted in a parsimonious ranking of potential matches of individuals in an image library. Automated matches were compared to manual-matching results to test the performance of the software and algorithm.

Results: Validation of matched and non-matched images provided a threshold IC weight (approximately 0.2) below which match certainty was not assured. Most images tested were assigned correctly; however, scores for the by-eye comparison were lower than expected, possibly due to the low sample size. The effect of increasing horizontal angle of sharks in images reduced matching likelihood considerably. There was a negative linear relationship between the number of matching spot pairs and matching score, but this relationship disappeared when using the IC algorithm.

Conclusion: The software and use of easily applied information-theoretic scores of match parsimony provide a reliable and freely available method for individual identification of wildlife, with wide applications and the potential to improve mark-recapture studies without resorting to invasive marking techniques.

Background

Effective approaches for the management and conservation of wildlife populations require a sound knowledge of population demographics [1]. For many species, such information is provided by studies that recognize individual animals so that their fate can be followed through time, thus allowing for the estimation of demographic rates like survival [2]. Individual recognition may be achieved either by applying an artificial mark to an animal or by using an animal's natural markings [3]. The former technique is pervasive in ecological studies addressing questions from the purely theoretical [e.g., [4]] to the highly applied [5], and it has been used on both marine and terrestrial species of vastly different sizes [e.g., [6,7]].

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Brain shape in human microcephalics and Homo floresiensis

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Notes:

Applying artificial marks to wildlife can, however, alter natural behaviour and reduce individual performance [e.g., [8]]. The marking process itself may be disruptive [9] due to the necessity of handling and restraining for mark application [10]. The loss of marks over time [11] and the non-reporting of retrieved marks [12] can also compromise the estimation of demographic parameters. Additionally, there are often a host of ethical and welfare issues that can arise from the application of permanent or temporary marks [13,14].

To address some of these problems, the identification of individual animals from their natural markings has become a major tool for the study of some animal populations [15], and has been applied to an equally wide range of animals from badgers [16] to whales [17,18]. One of the more popular techniques of recording the natural markings of an animal is photo-identification as this allows storage of photos in a library for subsequent cross-matching and generation of capture-history matrices [17,19]. These libraries can be examined manually to develop a suite of individual matches [19]; however, as the number of photos in a library increases beyond a person's capacity to process the suite of candidate matches manually, the development of faster, automated techniques to compare new photographs to those previously obtained is required [20,21]. Several automated matching algorithms have been trialled with some success [e.g., [20,22-26]], but these are generally highly technical, specialized and target a particular taxon or unique morphological feature of the species in question (e.g., dorsal fin shape and markings in cetaceans). Furthermore, uncertainty in the matching algorithms themselves have never been contextualized within a multi-model inferential framework [27], and so subjective manual matching is still required to assess reliability [28].

An example taxon that lends itself well to the development and application of a generalist algorithm for photo matching is the world's largest fish – the whale shark (*Rhincodon typus*). This species has been the recent subject of several photo-identification studies [e.g., [19,20,29]], some of which have already provided valuable information on population size, structure [19] and demography [29] under the supported assertion that the spot and stripe patterns of animals are individually unique and temporally stable [19]. The initial assessment of the demography of one population (Ningaloo Reef, Western Australia) [19] has been complicated by the addition of many hundreds of photographs taken during analogous research programmes in other parts of Australia, Belize, USA, Philippines and Mexico [30], and elsewhere (Djibouti, Seychelles and Mozambique). Consequently, the number of photographs available has exceeded the number that can be reliably matched by eye, thereby necessitating an automated system of matching. One such system has been developed from an algorithm originally designed for stellar pattern recognition, and is currently being employed by the ECOCEAN whale shark database [20]. This system has great potential; however, the procedure for entering and matching patterns is complex, and neither the algorithm nor results are publicly available. Therefore, a simple, yet reliable algorithm accessible to the public is needed to incorporate effectively a large number of photographs from a wide range of researchers, tourist operators and private organizations. Such a software package has recently been developed and is known as Interactive Individual Identification System (I^3S) [31,32].

Our aim in this paper is to assess the reliability of this simple, freely available software package that recognizes spot patterns for use in photo-identification studies of wildlife. Although we focus on whale sharks as an example system, the application of the computer package and the information-theoretic matching algorithms we develop can be applied to any marine or terrestrial species demonstrating some form of stable spot patterning (e.g., sharks, frogs, lizards, mammals, butterflies, birds, etc. – Fig. 1). We assess the reliability of this package by comparing known matches made by eye. We also determine the effect of variation in the horizontal angle of subjects (Fig. 2) in matching reliability, as well as how the number of spot pairs in matched images affects matching performance. All matching results are developed within a fully information-theoretic framework that incorporates all of the uncertainty associated with the matching algorithm, thus aiding users in providing reliability assessments to their matches and the resulting capture histories and demographic estimates. As such, we provide a novel and parsimonious method for assessing the reliability of pattern matching applicable to a wide range of naturally identifiable wildlife species.

Results

I^3S (Interactive Individual Identification Software) matching validation

The Information Criterion weights (w) for the most parsimonious matches (w_1) for the 50 matched pairs (100 images) were broadly distributed between 0.05 and 0.85, while w_1 for the 50 non-matched pairs (100 images) were highly right-skewed (Fig. 3a,b). All w_1 for non-matched pairs were <0.18. The median w_1 for matched pairs was 0.32 (± 0.05), which was much greater than the median for non-matched pairs (0.06 ± 0.01). Evidence ratios for the best-matched relative to the next-highest matched images (ER_1) for known matched pairs were also highly right-skewed and ranged from 0.73 to 51.92, with a median of 7.36 (± 2.45) (Fig. 3c). ER_1 for non-matched pairs were all <3.5 (median = 1.21 ± 0.09) (Fig. 3d). Evidence ratios for the second best-matched relative to the

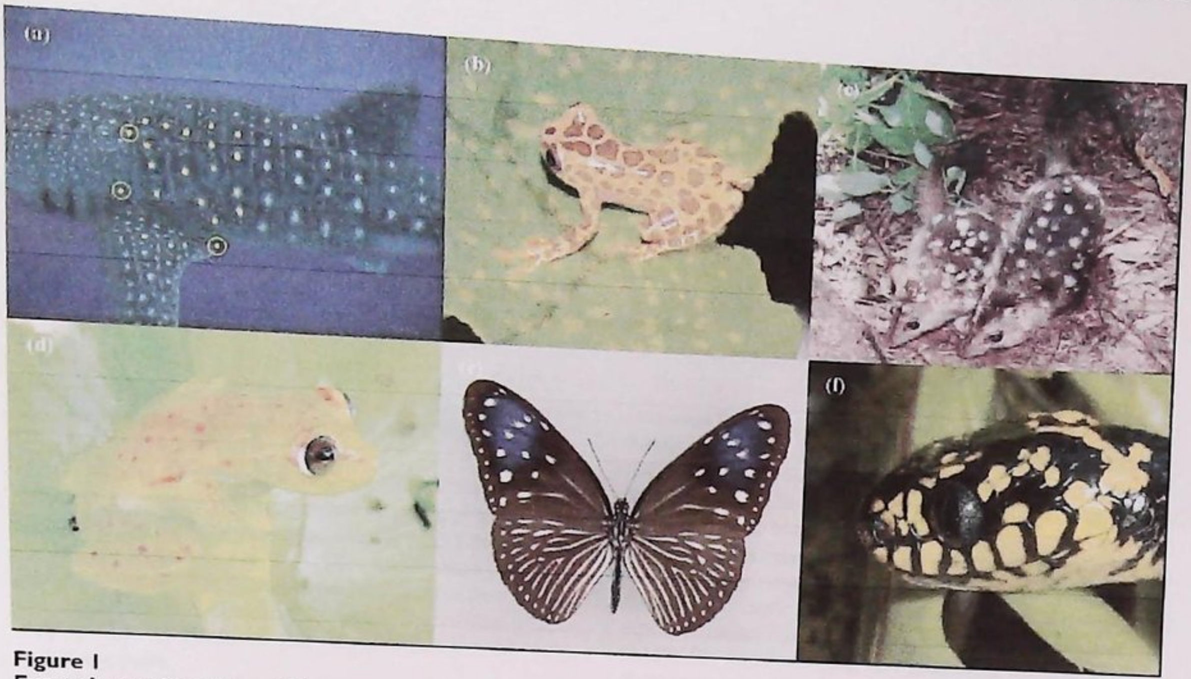

Figure 1

Example species with sufficient spot patterning that could be useful for automated photo-identification. Shown are (a) whale shark (*Rhincodon typus* – Photo © G. Taylor) indicating the reference area defined as the area encompassed by the reference points (yellow circles); (b) spotted tree frog (*Hyla leucophyllata* – Photo © D. Bickford); (c) northern quoll, (*Dasyurus hallucatus* – Photo © J. Kirwan); (d) Amazon spotted frog (*Hyla punctata* – Photo © D. Bickford); (e) striped blue crow (*Euploea mulciber* – Photo © D. Lohman); and (f) mangrove snake (*Boiga dendrophilia* – Photo © D. Bickford).

next-highest matched images (ER_2) for known matched pairs ranged from 0.73 to 114.18, with a median of 7.57 (± 3.82). ER_2 for non-matched pairs were also all <3.5 (median = 1.42 ± 0.12).

Overall, 93 images out of the 50 known-matched pairs were matched correctly using I^{3}S. w_1 for the correctly assigned matches ranged from 0.05 to 0.85 (median = 0.36 ± 0.05), and their ER_1 ranged from 0.73 to 51.92 (median = 8.82 ± 2.56) (Fig. 4a,b). Known-matched photographs that I^{3}S failed to match (7 images) had w_1 that ranged from 0.05 to 0.14 (median = 0.07 ± 0.02), with their ER_1 ranging from 0.95 to 2.28 (median = 1.23 ± 0.36).

Assessing 'by-eye' matches using I^{3}S

Of the 33 individuals re-sighted between years in the database used by Meekan et al. [19], 10 individuals could not be matched with I^{3}S because their images were not amenable to I^{3}S fingerprinting (absence of reference points) or their match was not present in the database. This was because the Meekan et al. [19] study also used images from a separate database and included scar-identified individuals that were not available for photographic matching using I^{3}S. Thus, we could only re-assess 23 of these by-eye matches that included 13 LS matches and 16 RS matches (58 images total).

Forty-eight of the 58 images (83%) from the 23 individuals were matched correctly using I^{3}S. w_1 for the correctly assigned by-eye matches ranged from 0.05 to 0.53 (median = 0.16 ± 0.04) (Fig. 5a), and their ER_1 were between 1.04 and 24.57 (median = 2.33 ± 1.58) (Fig. 5b). Incorrectly assigned by-eye matches had w_1 ranging from 0.04 to 0.13 (median = 0.06 ± 0.01) and their ER_1 ranged from 0.67 to 2.76 (median = 1.04 ± 0.37). I^{3}S also identified two images that were false positives (i.e., sharks that were incorrectly matched with other photographs) in the by-eye matching process. Neither of these images was matched with other known images of the identified sharks.

Horizontal angle

Mean w_1 decreased linearly as the horizontal angle of subjects within images increased (Fig. 6a). Median w_1 ranged between 0.92 (± 0.06) for angles of 10°, to 0.29 (± 0.13) for angles of 40°. The images of subjects at 30° had w_1 approaching those of non-matching pairs, and the distri-

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Neuroscience

Brain shape in human microcephalics and *Homo floresiensis*

(virtual endocast)

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Edited by Marcus E. Raichle, Washington University School of Medicine, St. Louis, MO, and approved December 7, 2006 (received for review October 18, 2006)

Because the cranial capacity of LB1 (*Homo floresiensis*) is only 417 cm^3, some workers propose that it represents a microcephalic *Homo sapiens* rather than a new species. This hypothesis is difficult to assess, however, without a clear understanding of how brain shape of microcephalics compares with that of normal humans. We compare three-dimensional computed tomographic reconstructions of the internal braincases (virtual endocasts that reproduce details of external brain morphology, including cranial capacities and shape) from a sample of 9 microcephalic humans and 10 normal humans. Discriminant and canonical analyses are used to identify two variables that classify normal and

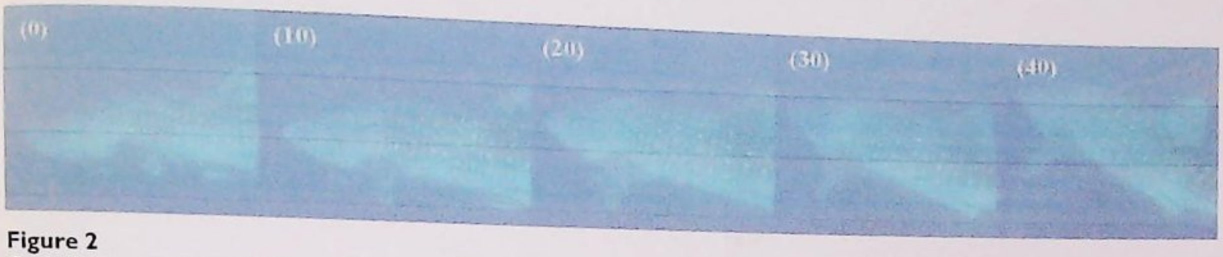

Figure 2
An individual whale shark at varying angles of yaw (A: 0°, B: 10°, C: 20°, D: 30°, E: 40°). Sequences such as this were used to assess the effect of horizontal angle on the I^3S matching process.

bution of w_1 for images of subjects at 40° overlapped the distribution of w_1 for non-matching pairs (Fig. 6a).

There was an exponential decline of median ER_1 with increasing angle (Fig. 6b). Median ER_1 ranged from 69.16 (± 52.24) for images of subjects at 10°, to 1.56 (± 2.81) for images of subjects at 40°. The distribution of ER_1 for images of subjects at 30° approached that for non-matching pairs, and the distribution of ER_1 for images of subjects at 40° overlapped the ER_1 distribution for non-matching pairs.

Number of spot pairs

There was evidence for a negative relationship between the transformed I^3S scores and spot pairs ($ER = 9.94 \times 10^5$, adjusted $R^2 = 0.26$; Fig. 7a), but no evidence for a relationship between w_1 and the number of spot pairs ($ER < 1$; Fig. 7b).

Discussion

Consistent, non-intrusive and ethically acceptable methods of mark-recapture are essential for estimating reliable demographic rates for wildlife populations, particularly for threatened species [29,33]. Photo-identification has become a widely accepted method of mark-recapture that has been empirically tested over a broad range of species [e.g., [16,17,34]]. Despite the advantages of this technique, there is the potential for large photographic databases to compromise the reliability of matches made by eye, which can subsequently jeopardize reliable estimates of population demographics. This problem has been largely overcome for several species by computer-aided image-matching algorithms that match various unique features of individuals [20,28,35-37]. However, most of these programs have limited applications, may be complex to operate, or are not freely available.

Software inaccessibility and the corresponding isolation of potentially useful photographic datasets will likely compromise parameter estimation and lead to higher uncertainty for calculated vital rates. For example, centralized photographic catalogues are common in the field of cetacean research, with new photographs from observers being compared to those previously obtained and the results sent to collaborators worldwide [38]. This type of data sharing for large, long-lived and wide-ranging species is an essential component of effective population management. Open-source matching software coupled with matching algorithms exploiting the power of information theory will make this process more efficient and less prone to error. Our main objective was to provide a procedure for incorporating full matching uncertainty into the photo-identification process using a freely available and simple software package. Despite the relatively low number of photographs with which we tested our approach, the performance of the system is satisfactory from the perspective of estimating reliable demographic information for a host of wildlife species.

Our assessment of a simple, freely available spot pattern-matching software package coupled with an information-theoretic incorporation of matching uncertainty was particularly effective for whale sharks given that their natural spot patterns were ideally suited for assessment using the I^3S program. Validation of I^3S matches using the Information Criterion algorithm provided a threshold w_1 for known matched pairs of approximately 0.2, below which w_1 for non-matched pairs fell. Known matched pairs not matched by I^3S, or that were matched with low (i.e., <0.2) w_1, likely resulted from poor clarity or high angles of yaw. This emphasizes the need to select images of the highest quality for matching purposes [39]. The validation process is necessary with most computer-aided matching algorithms because this alleviates much of the subjectivity associated with the final stage of matching. In the case of whale sharks, the 0.2 threshold proved to be a robust and conservative measure of certainty, but the particular value of the threshold will likely vary among species. Nonetheless, in the absence of validation data we suggest that using this threshold value is a good first approximation.

The validation stage of photographic matching can be further confirmed by using genetic tagging to identify individuals [15], and this approach is proliferating in mark-

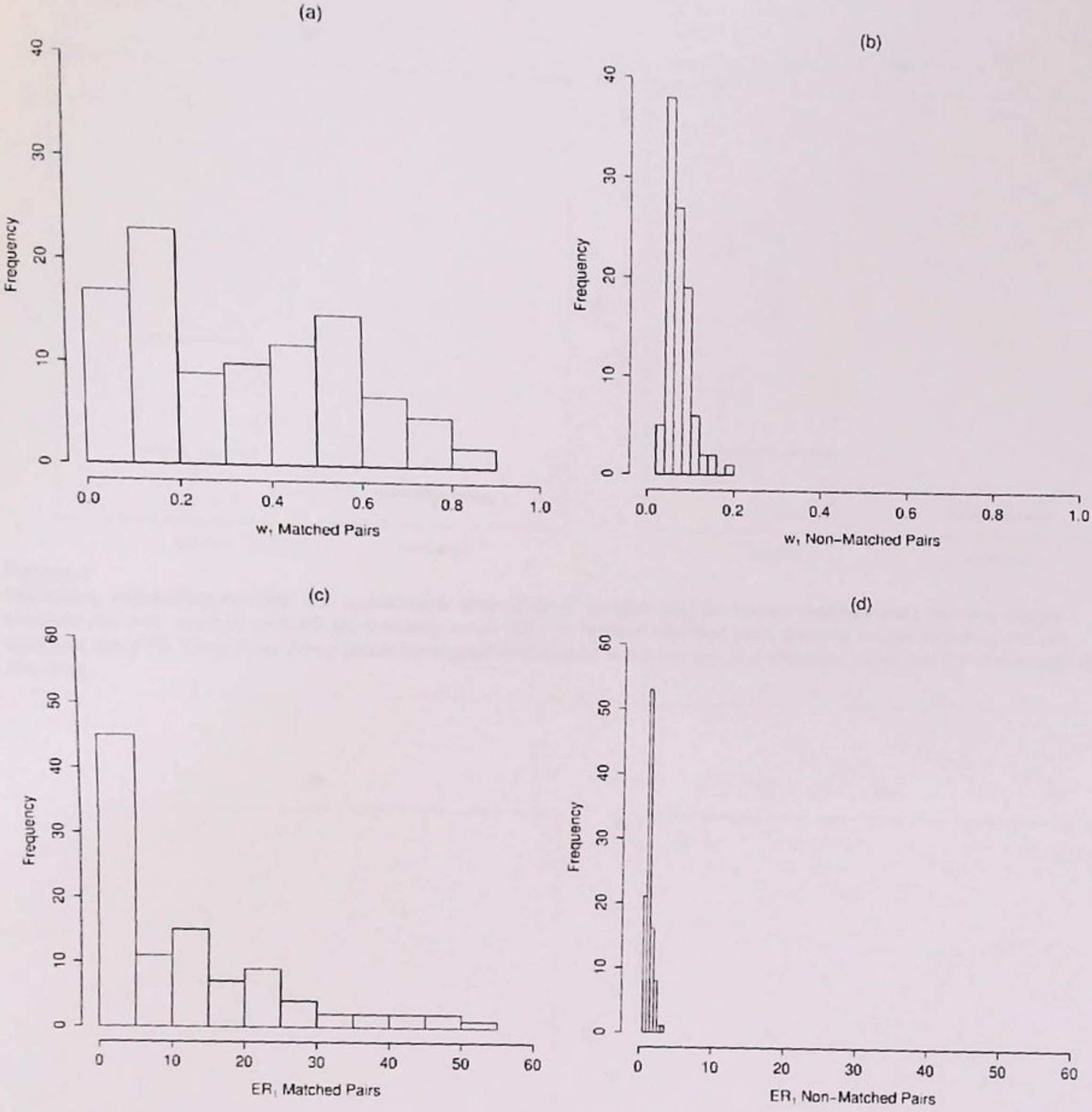

Figure 3
I³S matching validation IC weights (w_I). Distribution of IC weights for known matched (a) and non-matched pairs (b), and I³S matching validation evidence ratios (ER_I) for known matched (c) and non-matched pairs (d) are shown.

recapture studies. Genetic tagging also has the advantage of providing additional individual- and population-level information (e.g., genetic diversity, parent-offspring relationships, etc.) [40]. Because whale sharks are highly photographed and tissue sampling may be difficult, it is unlikely that genetic tagging will replace photographic identification in the near future, even though genetic information will provide further validation of photographic matching success.

The open-source program I³S [32] was effective at confirming past matches made by eye in the majority of instances. Images that were successfully confirmed using our Information Criterion algorithm received relatively

crocephalic humans with 100% success. The classification functions classify the virtual endocast from B1 with normal humans rather than microcephalics. On the other hand, our classification functions classify a pathological *H. sapiens* specimen that, like LB1, represents an ≈3-foot-tall adult female and an adult Basuto microcephalic woman that is alleged to have an endocast similar to LB1's with the microcephalic humans. Although microcephaly is genetically and clinically variable, virtual endocasts from our highly heterogeneous sample share similarities in protruding and proportionately large cerebella and relatively narrow, flattened orbital surfaces compared with normal humans. These findings have relevance for hypotheses regarding the genetic substrates of hominin brain evolution and may have medical diagnostic value. Despite LB1's having brain shape features that sort it with normal humans rather than microcephalics, other shape features and its small brain size are consistent with its assignment to a separate species.

Author contributions: D.F., C.H., and K.S. designed research; D.F., C.H., K.S., M.J.M., T.S., J., E.W.S., H.I., H.S., and F.P. performed research; D.F., C.H., and K.S. analyzed data; and D.F., C.H., K.S., M.J.M., and F.P. wrote the paper.

The authors declare no conflict of interest.

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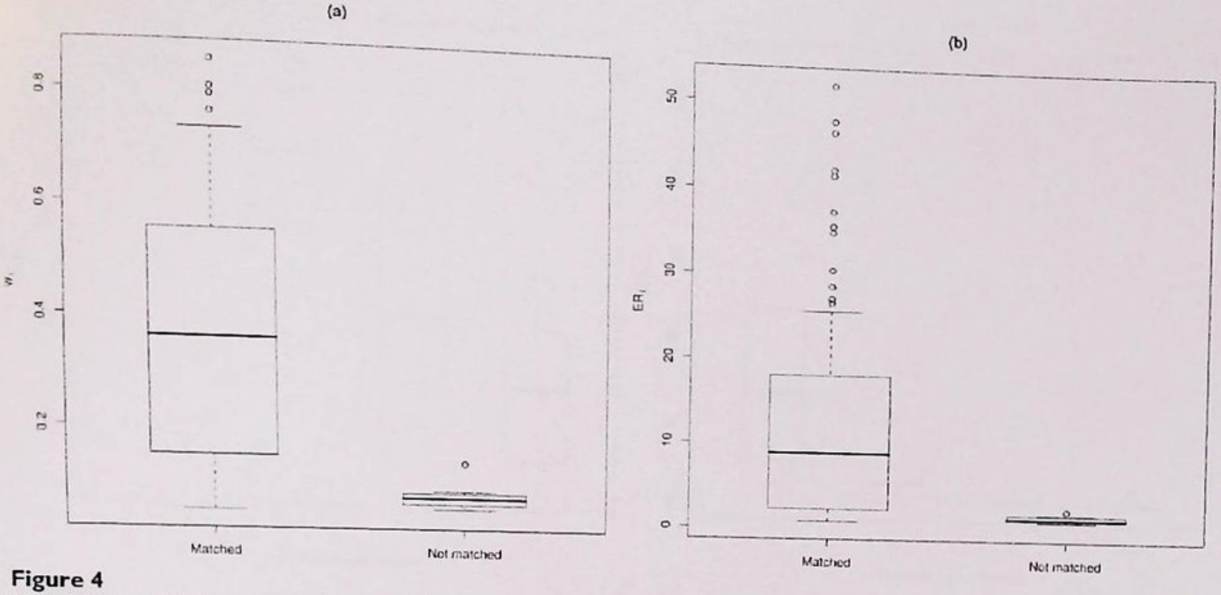

Figure 4
Matching validation results. Box-and-whisker plots of (a) IC weights (w_i) for known matched pairs showing images matched and not matched with I^{3}S; (b) evidence ratios (ER_i) for known matched pairs showing images matched and not matched using I^{3}S. Central tendency (black horizontal line) indicates the median, and whiskers extend to 0.5 of the inter-quartile range.

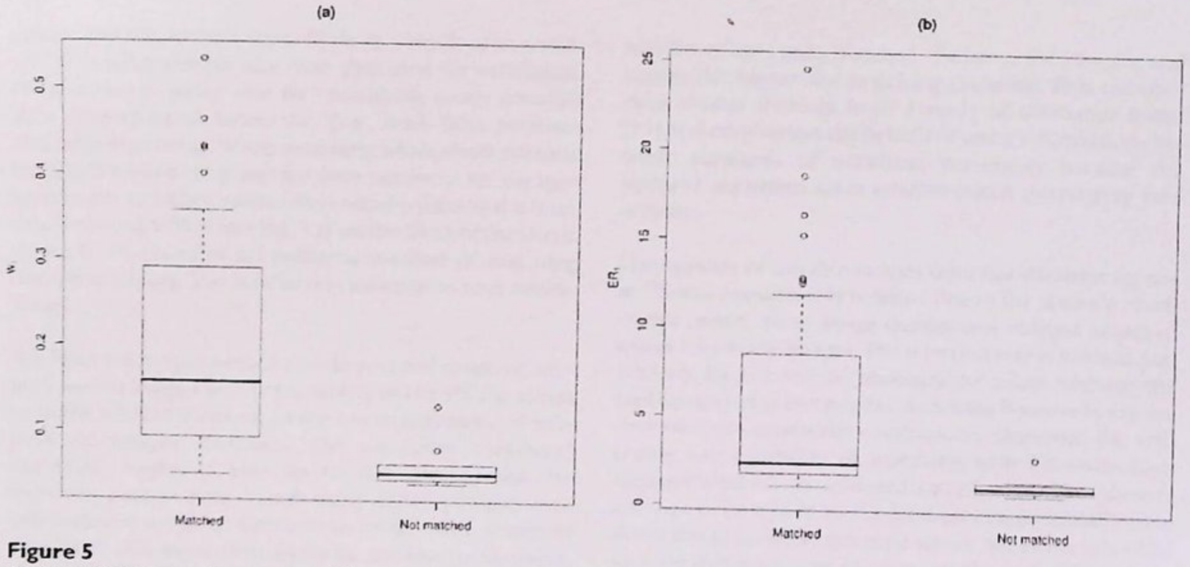

Figure 5
Automated versus by-eye matching results. Box-and-whisker plots of (a) IC weights (w_i) for by-eye matched images that were matched and not matched using I^{3}S; (b) Evidence ratios (ER_i) for by-eye matched images that were matched and not matched using I^{3}S. Central tendency (black horizontal line) indicates the median, and whiskers extend to 0.5 of the inter-quartile range.

AMERICAN MUSEUM NOVITATES

Number 9 June 3, 1921

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A REMARKABLE CASE OF EXTERNAL HIND LIMBS IN A HUMPBACK WHALE

By Roy Chapman Andrews

In July 1919, a female Humpback Whale (*Megaptera nodosa*) with two remarkable protrusions on the ventral side of the body, posteriorly, was captured by a ship operating from the whaling station at Kyuquot, on the west coast of Vancouver Island, British Columbia.

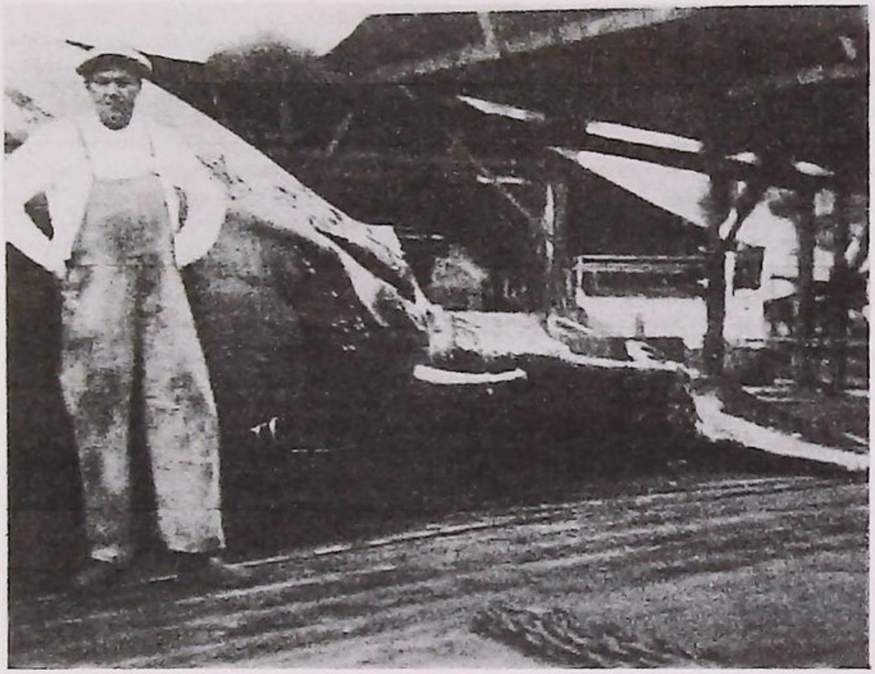

Fig. 1. Caudal part of the whale, showing the hind limb *in situ*.

One of the protrusions was cut off by the crew of the vessel but the other was photographed *in situ* by the superintendent of the Station. Mr. Sidney Ruck and Mr. Lawson, officials of the Consolidated Whaling Company, appreciated the importance of the discovery and presented the skeletal remains of the attachment to the Provincial Museum, Victoria, B. C.

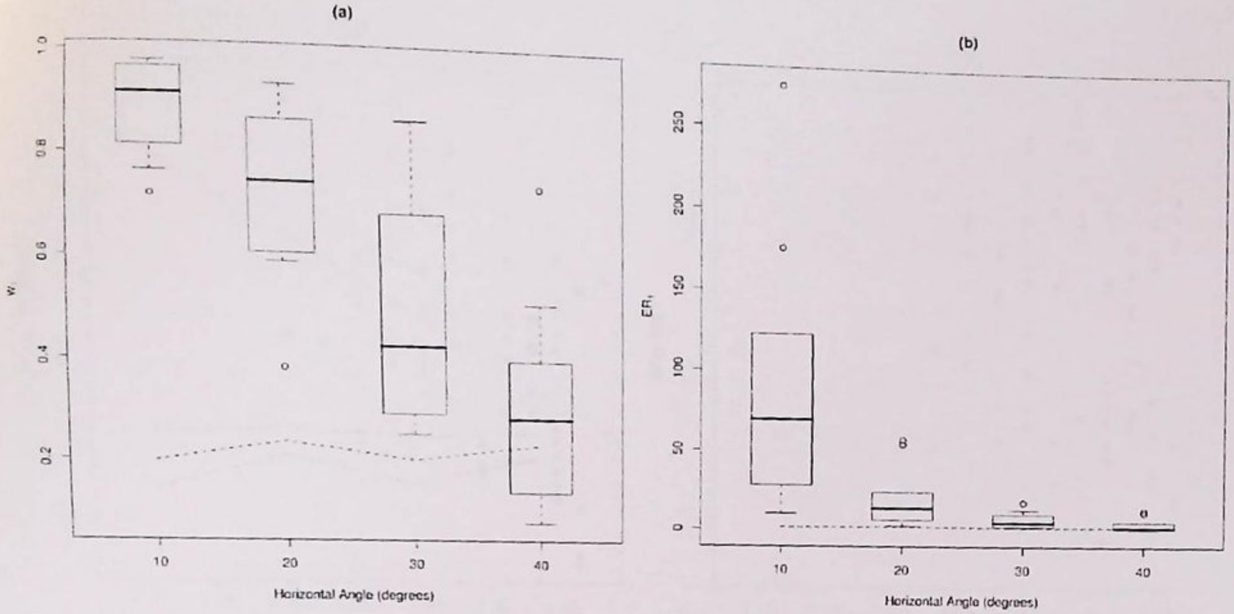

Figure 6

Effect of angles of yaw. Box-and-whisker plots of (a) IC weights (w_1) for horizontal angle categories, where images at 0° were matched against images skewed by 10°, 20°, 30° and 40°. Dotted lines show results for non-matching pairs; (b) evidence ratios (ER_1) for horizontal angle categories, where images at 0° were matched against images skewed by 10°, 20°, 30° and 40°. Central tendency (black horizontal line) indicates the median, and whiskers extend to 0.5 of the inter-quartile range.

low w_1 and ER_1 overall, most likely as a result of a considerably smaller sample size than that used for validation. I³S was also a useful tool for identifying image matches that were assigned incorrectly (i.e., both false positives and false negatives). When matching whale shark patterns by eye, the observer generally does not focus on the spot pattern *per se*; rather, attention is usually paid to the intricate lines and whirls (see Fig. 1a) on the flank of the shark. As such, I³S provides an unbiased method of matching natural markings that is relatively immune to user subjectivity.

We found strong evidence that horizontal angle of subjects within images affects the ability of the I³S algorithm to make reliable matches. As the horizontal angle of subjects in images increases, the matching likelihood decreases. Angles of yaw up to 30° compromise the matching process even though many of these images were still matched correctly. Conversely, images with angles of yaw ≥40° will more than likely be incorrectly assigned. Due to the linear algorithm used by I³S to match spot patterns it is important to use only those photos with as little contortion of the reference area as possible. Likewise, the number of spots annotated in fingerprints can also potentially affect the I³S matching process. The higher the number of spot pairs matched, the lower the I³S score and hence, the higher the matching certainty. This corroborates similar findings from a study of *Carcharias taurus* [31] and emphasizes the benefit of using information-theoretic measures of matching parsimony because the updated algorithm takes relative match uncertainty into account.

The number of suitable images from our database for use in I³S was considerably reduced due to the absence of reference points, poor image quality and oblique angles of subjects in many images. The rejection rate is inflated particularly by the use of photographs taken without the explicit aim of photographic matching because many are derived from ecotourism operations. However, the efficiency and reliability of matching with I³S more than compensated for the reduced sample size. The number and size of images in an I³S database can potentially slow down the program's operating speed; therefore, it is ideal to scale down the size of photographs and only include the best image of a particular animal. In addition to horizontal angle, roll and pitch of sharks in images may affect the matching process. Pitch seems likely to be only a minor problem because digital photos can be rotated so that the animal is aligned with the horizontal. We had few

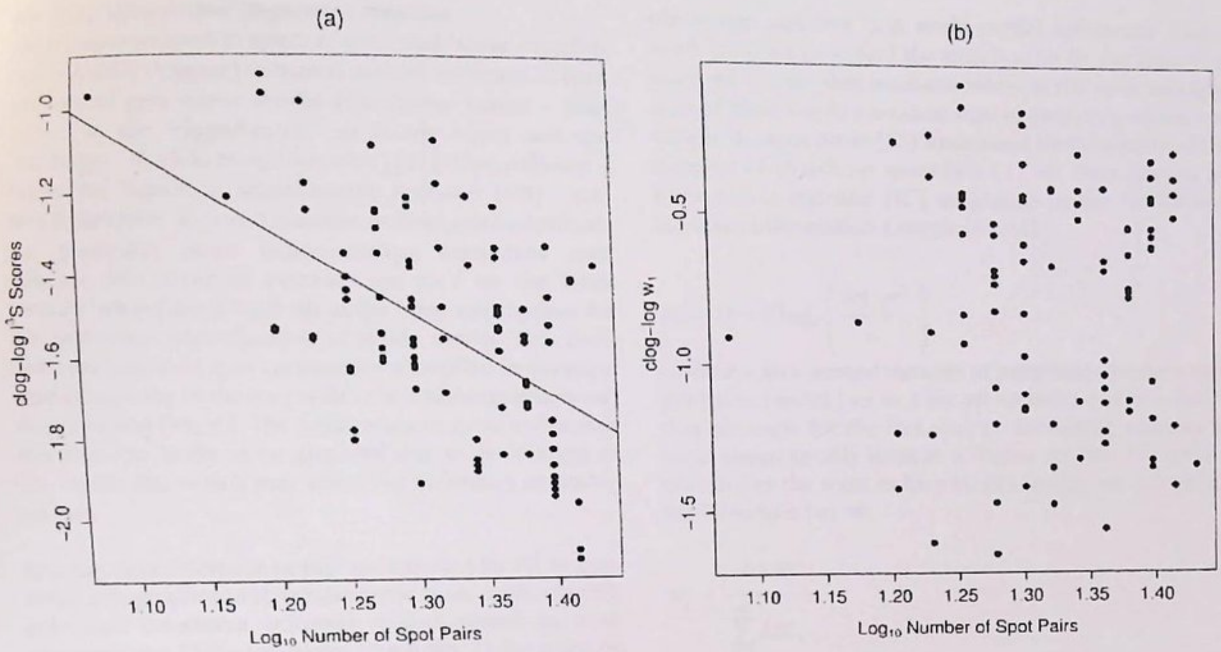

Figure 7
Effects of spot-pair number. (a) Relationship between complementary log-log-transformed (clog-log) I^{3}S scores and log$_{10}$-transformed number of spot pairs. The fitted line illustrates the correlation observed using a linear regression; (b) Comparison of clog-log-transformed w_1 with log$_{10}$-transformed number of spot pairs.

images of the same individual at varying angles of roll, so we were unable to examine this potential problem.

Conclusion

The application of I^{3}S to any animal with a unique, stable spot pattern holds particular promise for mark-recapture studies. The program is particularly well suited to organisms that have minimal contortion in the desired reference area and have spots that are relatively homogenous in diameter and size. Large, irregular spots may cause problems during fingerprinting because the centre of the spot may vary according to the user's preference. For example, a species with a spot pattern that may not be well suited to I^{3}S is the manta ray (*Manta birostris*) due to its large, sparsely spaced and irregular ventral spot patterns [41]. However, other species of ray such as the white spotted eagle ray (*Aetobatus narinari*) have evenly spaced and relatively homogenous spot patterns on the dorsal surface that would lend themselves more readily to the fingerprinting process. Other organisms that are potentially suitable candidates include: felids, some cetaceans, many birds, amphibians and reptiles, and other elasmobranchs.

The benefits of non-intrusive mark-recapture studies are numerous, not only in terms of animal welfare, but also from a logistical perspective. The software availability and applicability of I^{3}S for a wide range of animals will enable researchers to store and match images for mark-recapture purposes, thus hopefully contributing to robust and more precise estimates of key life history parameters. Reliable, effective photo-identification for animals with stable, natural markings is now possible for anyone armed with a digital camera.

Methods

Whale shark photo library

The library contains 797 photos taken by researchers and tour operators during the months of March–July from 1992–2006 at Ningaloo Reef (22° 50′ S, 113° 40′ E), Western Australia. The method of image capture varied over time, so that still, video and digital images were all included in the library. A 'by-eye' comparison of 581 images in this photo library, (this total excludes several images collected in the 2001 season, as well as all photos collected between 2003 and 2006), was originally completed. During analysis, photos were sorted into quality classes on the basis of clarity, angle, distinctiveness, partial image and overall quality [39]. More details of the manual matching procedure are provided in reference [19].

At my request, Mr. Francis Kermode, Director of the Provincial Museum, very courteously submitted the bones to me with permission to publish upon the result of my examination.

Under date of March 4, 1920, Mr. Ruck writes to Mr. Kermode as follows:

> I enclose herewith three photographs showing the unusual development of the pelvic Rudiments in a whale captured at the Kyuquot Station last July, of which you have the bones. It is to be regretted that better pictures in evidence of this unprecedented development were not obtained.
>
> I have been connected with the Whaling Industry for 22 years and during my time have come in contact with prominent Naturalists such as Professor True of the Smithsonian Institute, Professor Lucas of the Natural History Museum, Brooklyn,[1] and Professor Andrews of the Natural History Museum, New York, and neither in their experience or mine have the protrusion of the pelvic bones beyond the body ever been seen or heard of.
>
> This particular whale was a female humpback of the average length with elementary legs protruding from the body about 4 feet 2 inches, covered with blubber about one-half an inch thick.
>
> As shown in the best photograph these legs protruded on either side of the genital opening; the left leg was cut off by the crew of the vessel and lost, and the point at which it was cut off is clearly shown in the photograph. The end of the leg seen in the picture terminated in a kind of round knob like a man's clenched fist.
>
> The two bones of the leg which you have are connected by cartilage which I was informed had shrunk about 10 inches, and possibly more by this time. At any rate the total length of the leg before it was cleaned of the blubber and flesh was, as before stated, about 4 feet, 2 inches, from the body.

After studying the material and discussing it with various scientists, I have come to the conclusion that the protrusions actually do represent vestigial hind limbs and show a remarkable reversion to the primitive quadripedal condition.

I am well aware that zoologists are inclined to accept reported instances of reversion with extreme reluctance and that, at first sight, the tendency will be to consider this a teratological case of no reversionary significance, but the evidence is so strong that I can not interpret it in that way.

Mr. Ruck reports that the total length of the leg "before it was cleaned of the blubber and flesh" was about four feet and two inches. The skeletal remains in my possession consist of two bones and two heavy cartilages. When placed in position as in Fig. 2, the total length is 31 inches.

---

[1] Then of the U. S. National Museum, now of The American Museum of Natural History.

Matching software and fingerprint creation

The software we used to generate potential image matches was originally designed to match natural variation in spot patterns of grey nurse sharks (*Carcharias taurus* – also known as the "ragged-tooth" in South Africa and the "sand tiger" shark in North America) [31]. This software – Interactive Individual Identification Software (I^3S) – creates 'fingerprint' files and matches individuals by comparing particular areas demonstrating consistent spot patterns. We chose to examine the area on the flank directly behind the 5th gill slit as the most appropriate for the individual identification of whale sharks. This decision was based on spot consistency identified in previous studies and due to the ease with which photographers can view this area [19,20]. The positioning of spots in this area was also less likely to be distorted due to undulation of the caudal fin, which may affect the software's matching success.

At least three reference points are required by I^3S to construct a fingerprint [31]; we chose the most easily identifiable and consistent reference points visible in flank photographs: 1) the top of the 5th gill slit, 2) the point on the flank corresponding to the posterior point of the pectoral fin and 3) the bottom of the 5th gill slit (Fig. 1a). The requirement of all three reference points to be visible in the photograph for a fingerprint to be created meant that not all 797 photos could be used. As such, we could compare 433 (54%) of the original photographs, of which 212 were of the left side (LS) and 221 were of the right side (RS) of the shark.

In this updated database, images were matched by an operator highlighting spots within the reference area on a computer screen. Three initial reference points for each image were entered (Fig. 1a), followed by the manual adding of a digital point to the centre of the most obvious spots within the reference frame. Using a search function, the software compares the new fingerprint file against all other fingerprint files in the database by using a two-dimensional linear algorithm, which is simply the sum of the distances between spot pairs divided by the square of the number of spot pairs [31]. The matched spot pairs with the minimum overall score (ranging from 0 [perfect match] to a value <1) is the most likely match. The program also lists the next 49 most likely image matches, which it ranks in decreasing order of likelihood. A search result output text file provides a list of the 50 matches, spot pairs compared, as well as a matching score. We then incorporated the I^3S text output into the *R* Package [42] for further analysis [see Additional file 1].

Information criterion algorithm

To provide a measure of match parsimony based on the philosophy of information theory and to compare possible image matches in a multi-model inferential framework [27], we modified the match score in the following manner: (1) we first back-transformed the spot-averaged sum of distances to a residual sum of distances, which was simply the spot score (*SS*) multiplied by the square of the number of matching spots (n); (2) we then created an information criterion (IC) analogous to the Akaike and Bayesian Information Criteria [43,44]:

$$\mathrm{IC} = 2k + n'\log_e\left(\frac{SS \cdot n^2}{n'}\right)$$

where k = an assumed number of parameters under a simple linear model (set to 1 for all models) and $n' = 100/n$ that accounts for the fact that an increasing number of spots automatically leads to a higher *SS* (the 100 multiplier scales the term to be >1); (3) finally, we calculated the IC weight (w) as:

$$w_i = \frac{e^{-0.5\Delta \mathrm{IC}_i}}{\sum_{i=1}^{m} \Delta \mathrm{IC}_i}$$

where $\Delta\mathrm{IC} = \mathrm{IC} - \mathrm{IC}_{min}$ for the i^{th} image (i^{th} 'model') from 1 through m (where $m = 49$). We also calculated the information-theoretic evidence ratio (*ER*) [27] for each matched image relative to the top-ranked image based on the w to provide a likelihood ratio of match performance. Here, ER_1 is the w of the top-ranked matched photograph divided by the next most highly ranked photograph's w, ER_2 is the w of the top-ranked match divided by the w of the third-best match, and so on. Therefore, ER_1 provides a likelihood ratio for the match of the top-ranked photograph relative to the next most highly ranked photograph.

Match validation

To establish the ability of the w_i and *ER* indices to assign reliable matching, we endeavoured to establish a threshold value of w_1 and ER_1 below which matching uncertainty was too high to match photographs reliably. We therefore validated the approach by applying our algorithms to a sample of 200 images; 25 known matched pairs (i.e., matched by eye) from both the LS and RS databases (100 images total), and 25 non-matched pairs from both LS and RS databases (100 images total). The LS and RS images were analyzed separately, using text outputs from I^3S that report the candidate matching image names, I^3S matching scores and the number of spot pairs matched. A match was considered successful if the corresponding image was ranked at the top of the list of potential matches (i.e., number 1 of 50).

Assessing 'by-eye' matches using I^{3}S

Thirty-three individual sharks were re-sighted inter-annually during the manual 'by-eye' analysis of the raw photo library. Of any two by-eye matched images, one of the pair was entered into either the LS or RS database and searched. A match using I^{3}S was considered successful if the by-eye matched images were ranked as the most likely match (as with the validation test) and confirmed using the IC algorithm.

Horizontal angle (yaw)

Footage of 10 different sharks (5 LS and 5 RS) was used to capture sequences of five images of each shark, where subjects were on varying horizontal angles (0°, 10°, 20°, 30° and 40° – Fig. 2). The angles of yaw were estimated using Screen Protractor™ software. Fingerprints were created for each image with 20 spots annotated per fingerprint. The 10° images were searched against the 0° images and 10 non-matching images. This process was repeated, substituting images where subjects were on angles of 20°, 30° and 40° for both LS and RS image sequences. Five random, non-matching pairs were also searched against 0° and 10° images, and then repeated for 20°, 30°, and 40° images. This allowed for a comparison between matching and non-matching pairs while testing for the effects of horizontal angle in images. Results were analyzed using the IC algorithm applied to the match validation and by-eye comparison tests.

Number of spot pairs

Fifty known-matching pairs were compared to one another in I^{3}S. Of these matching pairs, only those successfully confirmed during validation of I^{3}S matches were included in this test. I^{3}S scores were compared against the number of spot pairs matched. The w_1 for each image was also compared against the number of spot pairs matched by the I^{3}S algorithm. A complementary log-log transformation (clog-log) was applied to normalize the distribution of I^{3}S scores and w_1, and a $\log_{10}$ transformation was used to normalize the distribution of spot pairs. We tested for a linear relationship between the transformed variables using least-squares regression and information-theoretic evidence ratios. Goodness-of-fit was assessed using the least-squares R^2 value.

Competing interests

The author(s) declare that they have no competing interests.

Authors' contributions

CWS, CJAB and MGM designed the study, CWS and CJAB did the analysis, and all authors contributed to writing the paper. CWS did most of the analysis with assistance from CJAB, and CWS took the lead in writing the manuscript.

Additional material

Additional file 1

R code to calculate Information Criterion (IC) weights for match parsimony. Full instructions for use of R code are contained within the text file.

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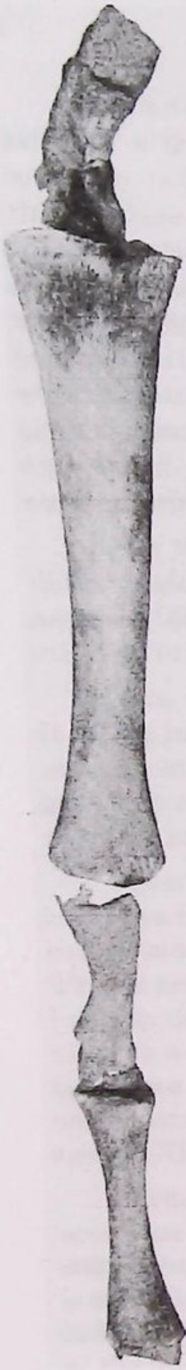

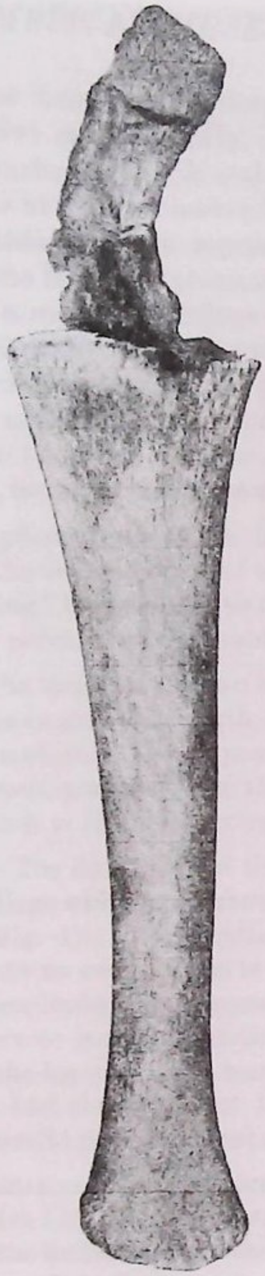

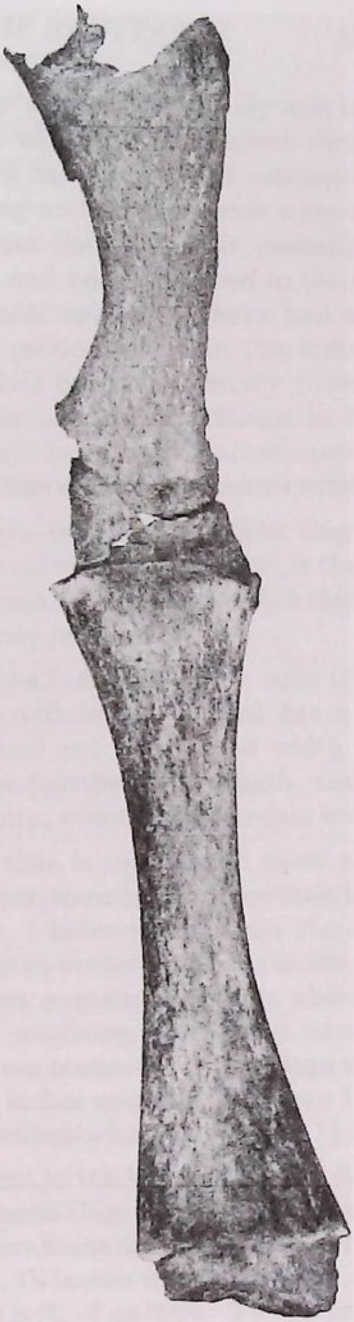

Fig. 2. Skeleton of the hind limb.
Fig. 3. Cartilaginous femur and osseous tibia.
Fig. 4. Cartilaginous tarsus and osseous metatarsal.

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Femur.—The larger bone is deeply concave proximally and to it is attached a massive cartilage (Fig. 3) which, in its present shrunken condition, is 5¼ inches in length and 1⅝ inches wide. I estimate that this cartilage was at least 15 inches long and 3 inches wide when fresh. I believe that this cartilage represents the femur. It probably lay entirely within the body, its proximal end being attached to the pelvic vestiges. Such a massive cartilage must necessarily have had a firm support and leads me to believe that the pelvic elements in this individual were of extraordinary size. The pelvic bones, as usually present in the *Megaptera*, are slender ossifications about 6 or 8 inches in length and would not furnish a firm enough base for the attachment of a cartilage which, in its fresh condition, was as large as a man's wrist.

Since the photograph of the limbs *in situ* shows that they were directly below the usual location of the pelvic vestiges and since there are no other "floating" bones near this region, the conclusion that they were attached to the pelvic elements is entirely justifiable.

Tibia.—The larger of the two bones I identify as the tibia (Fig. 3). It is 14¼ inches in greatest length, is well developed, and has a hard, smooth outer surface. At the proximal end its greatest width is 3¾, inches, it narrows gradually for three-fourths of its length, and then suddenly expands at the distal extremity, where it is 2½ inches wide.

Tarsus.—The distal end of the tibia is convex and gives attachment to a cartilage which in its shrunken state is 4¾ inches long and 1¾ inches wide (Fig. 4). This cartilage, I believe, represents the tarsus. That it presents no ossifications is by no means surprising as the carpal bones in the fore limbs of cetaceans are sometimes entirely absent and often in a more or less rudimentary condition. Mr. Ruck says "the two bones of the leg which you have are connected by cartilage which I was informed had shrunk about 10 inches and possibly more by this time." This would give the tarsal cartilage a length of nearly 15 inches.

Metatarsal.—The distal element in the leg is a hard, well-developed bone which I identify as a metatarsal (Fig. 4). It has the characteristic shape of the metacarpals in the fore limbs of cetaceans except that it is more slender. It is 6⅛ inches long, 1⅞ inches wide proximally, and 1⅞ inches in distal width; its least width is 15/16 of an inch. To the distal end of the metatarsal is attached a heavy cartilage of which only ¾ of an inch remains intact. This cartilage probably formed the extremity of the limb skeleton.

External Appearance of the Limb.—In reference to the limb as it appeared in the fresh condition, Mr. Ruck says that the end terminated in a "kind of round knob like a man's clenched fist," that the total length was about four feet and two inches, and that it was covered with blubber about one-half inch thick. I infer from Mr. Ruck's description that the connective tissue and blubber were essentially the same as in the flipper, or fore limb, of cetaceans. The photograph of the limb *in situ* (Fig. 1) show that there are two prominent, truncated tuberosities on the distal half. The proximal "bunch" evidently indicates the distal end of the tibia and the other is at the extremity of the metatarsal. These tuberosities may very properly be homologized with those on the outer, or anterior, edge of the flipper in the *Megaptera* which indicate the extremities of the radius and the second digit. This is, I believe, a point which has considerable significance.

Since the stalk-like cartilaginous femur probably lay entirely within the body and the remainder of the limb entirely outside, there was undoubtedly a certain flexibility at the point of junction with the body.

In a paper entitled 'Untersuchungen an walen,'[1] Professor W. Kükenthal has described external rudimentary hind limbs in three early embryos of *Megaptera*. These appear as two more or less caudally directed papillæ on either side of the genital organ in the same relative position as the hind limbs which I have described in this paper. In Kükenthal's Stage I (an embryo 32 mm. in length) the rudiments are best developed and are 12 mm. long. In Stage II (an embryo 28 mm. long) the rudiments are somewhat less distinct, reaching a length of [illegible] mm. In Stage III (an embryo 30 mm. long) the hind-limb rudiments have still more decreased in size and appear as minute papillæ.

Kükenthal has also discovered hind-limb rudiments in embryos of *Phocæna communis* and *P. dalli*, and Guldberg has recorded them in embryos of *Lagenorhynchus acutus* and *Phocæna communis*.

Kükenthal states that the hind-limb rudiments are found in later embryonic stages of the Mystacoceti than in the Odontoceti and concludes that in the evolution of cetaceans the hind limbs lost their functional character in the Odontoceti earlier than in the Mystacoceti.

Since Kükenthal's and Guldberg's researches have shown that external hind-limb rudiments are still present in some cases in embryonic life, it is by no means impossible that, these vestigial organs should continue their growth and persist until the adult stage. I believe that

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[1] Jenaische Zeitschrift für Naturwissenchaft, LI, 1914, pp. 49–52.

that is exactly what has occurred in the specimen which I have described above, and that we are confronted with a clear case of partial reversion to a primitive quadripedal condition.

The limbs, according to the statements of the whalers, were symmetrical; they are in the exact position in which the hind-limb rudiments have been found in embryonic *Megaptera;* there are strong indications that the cartilaginous femur was attached to the pelvic elements; they are homologous in many respects to the flippers, or fore limbs, and, were this a teratological case, it is doubtful if these homologies would exist.

Unwilling as are many evolutionists to accept reported cases of reversion, I can see no other explanation for the facts presented here. That this condition is extremely rare must certainly be true for, so far as I am aware, this is the only recorded case among cetaceans. The presence of rudimentary hind limbs would almost certainly attract the attention of whalers under any condition and eventually be reported to a scientific institution, as was done in the case under consideration. Although hundreds of thousands of whales have been killed, especially in the last fifty years since the beginning of shore-whaling, no other instance has been reported. We are greatly indebted to Mr. Ruck and Mr. Lawson for their quick appreciation of the importance of their discovery and I wish again to express my thanks to Mr. Kermode for giving me the privilege of describing it.

AMERICAN MUSEUM NOVITATES

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AMERICAN MUSEUM NOVITATES

No. 9

A REMARKABLE CASE OF EXTERNAL HIND LIMBS IN A HUMPBACK WHALE

By Roy Chapman Andrews

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Bird still elusive - or extinct

Tuesday, May 01, 2007

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COLUMBIA - After five months of looking, a team of Cornell University researchers have failed to find ivory-billed woodpeckers. The birds are feared to be extinct and have not been seen in the Congaree's old-growth forest since the 1930s.

Despite the failure, the searchers came away impressed by the Congaree National Park, South Carolina's only national park.

"It's the only place in all of the Southeast that has the old growth and the high tree diversity," said Martjan Lammertink, the Dutch native leading the Cornell search team. "It's not just the big trees; it's the whole multilayered structure of the forest."

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The team still thinks the 24,600-acre park is one of the most likely places for the "ghost birds" to be.

Lammertink has heard what he thinks was the ivory-billed's distinctive double-knock deep in the Congaree forest.

A videotaped snippet of an alleged ivory-billed in an Arkansas swamp two years ago regenerated the effort to search for the bird throughout the Southeast and that led to the Cornell mobile team.

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Tuesday, 08 May 2007

DNA test to see if 'extinct' quail survived 102 years

An isolated population of quail on Auckland's Tiritiri Matangi Island is thought to be a native species regarded as extinct for 102 years.

A Massey University researcher, Mark Seabrook-Davison, is carrying out genetic tests on the tiny ground-dwelling birds to confirm they are survivors of the New Zealand quail thought to have been extinct since about 1875.

"At this stage, the notion that these quail may be a surviving group of New Zealand quail is quite speculative," Mr Seabrook-Davison told the university's newsletter. "It's also been suggested that they may be a hybrid".

The New Zealand quail, coturnix novaezelandiae, were once abundant throughout the mainland and on Great Barrier Island, but are recorded as the second bird species to be wiped out during European settlement.

Seabrook Davison, part of the university's Auckland-based ecology and conservation group, said that quail were known to have been on Tiritiri Matangi for at least 100 years.

Genetic testing will be carried out at the university's Albany campus, to compare the birds with samples from museum specimens, and with introduced Australian quail.

The Australian brown or swamp quail – thought to be similar to the NZ native but half their size – californian quail and bobwhites are all established in the North Island for recreational hunting.

Mr Seabrook-Davison said that if the Tiritiri Matangi birds are shown to be native survivors, the find could also have important implications for future conservation projects in the Hauraki Gulf islands.

"There is keen interest in the possibility of putting these quail on to other islands," he said.

"Because they are a ground bird of a particular type, they play their own part in the bigger ecological picture. They are very good at distributing seeds and tilling the leaf litter."

Some ornithologists have expressed doubts about the possibility that the Tiritiri Matangi birds are native quail. Australia's brown quail are a different genus from the NZ species, so would be unlikely to have interbred with them.

Sir Joseph Banks reported sightings of the NZ quail about 1770 in his journal of James Cook's first voyage and the first specimen was formally described in 1827 near Thames.

But by 1840 it was less common, and in 1865 the population plunged in the South Island – apparently because its tussock grassland habitat was being destroyed by fires clearing land for farming.

Known to the Maori as the koreke, it was regarded as having been completely exterminated in the North Island by 1870, and the South Island populations had also vanished by 1875, according to the

Encyclopaedia of New Zealand.

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Helping Solve the "Other" Taxonomic Impediment: Completing the *Eight Steps to Total Enlightenment and Taxonomic Nirvana*

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> *"To discover is to draw the veil. It is not to run into something and keep it to oneself. It is to push back the frontier of infinity and to pass the news on to posterity."*
> —Mauricio Obregón

Background

Simply put: despite over ten years of recognizing the problem and giving it a catchy phrase, we still lack the taxonomic expertise to effectively describe the remaining biodiversity on earth. How can we enjoy and protect something if we don't know it is out there to enjoy and protect?

The Conference of the Parties to the Convention on Biodiversity (COP) at their meeting in Jakarta in 1995 echoed the warnings of previous committees organized around the world to outline the problems we face in the future of taxonomy. The perception by the COP of a lack of taxonomists to handle the enormous task identifying and naming the biodiversity we have yet to describe on this earth led the IUBS/Diversitas to term this lack of expertise as the "taxonomic impediment"[1]. Elaine Hoagland (1996) highlighted the term in her white paper on the subject for the COP. Her paper precipitated an overwhelming chorus of "I second that" by fellow taxonomists as well as in their subsequent discussions that fine-tuned proclamations of the need and the methods by which we could solve the problem.

Two years previous to Hoagland's report, the U.S. National Science Foundation (NSF) created the PEET program (Partnerships for Enhancing Expertise in Taxonomy) to enhance and increase taxonomic expertise in areas where it is deemed by colleagues and NSF review panels to be sorely lacking. Nine years later, NSF proudly declared "Taxonomic Impediment Overcome" (Rodman & Cody, 2003). The article's headline may have been a bit more embellishment than reality, but nevertheless, the effort by NSF in creating the PEET program—and also at about the same time the Biotic Surveys and Inventories Program (BS&I) (meant to foster broadscale collecting and discovery of species throughout the world) cannot be understated. They were both major leaps forward in showing the world that governments could in fact get behind taxonomy and support increasing the expertise that was lacking in that discipline and critical steps to helping solve that problem.

While even the most recent editorials on the taxonomic impediment and their respective responses (e.g., Wheeler *et al.*, 2004; Lyal & Wietzmann, 2004; Martin, 2004; Geeta *et al.*, 2004; Causey *et al.*, 2004; Young, 2004; Carvalho *et al.*, 2005) may argue the details, they clearly all agree with each other that we still lack taxonomic expertise to adequately describe the biodiversity on this planet. However, they all have apparently missed another "taxonomic impediment": one that darkens the potential successes made by NSF funding and other advances. Namely, that some of the existing taxonomists are not doing much or even any taxonomy. Numerous reasons exist for this unfortunate dilemma (see Summary below). Some that are inherently

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[1] Earlier uses of the phrase "taxonomic impediment" (e.g., Taylor, 1976; Ramsay, 1986; McIntyre *et al.*, 1992) are for aspects of taxonomic poverty other than lack of taxonomic expertise.

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common in collaborative survey work are outlined here with examples from a recently-funded NSF BS&I terrestrial arthropod survey in Fiji. That discussion is supplemented with a step-by-step process that explains the process of taxonomy and the sociological pros and cons to each step; and, if followed correctly by all taxonomists, will ultimately solve this "other" impediment.

"Cool. Gimme a free trip to Fiji"

Caveat: The Fiji BS&I Survey is very successful and it is only because it is that I can safely write this article warning of some of the pitfalls that may befall someone who tries to organize such a collaborative survey.

Among the many tasks in formulating a logical process and project design to the initial NSF Fiji Terrestrial Arthropod Survey (termed henceforth as "Fiji project") was creating an essential team of experts who would be critical to the success of the project by identifying taxa in their specialty group(s) [= target group(s)] and describing new species that was resulting from the massive Malaise trapping program that was already in place on many of the islands scattered throughout the Fiji Archipelago. To supplement and enhance the identification and description of those selected biodiverse elements in Fiji, team members were asked to participate in all-expenses-paid collecting trips to Fiji to personally collect their target group by whatever specialized method they deemed most appropriate and to help train in-country students and parataxonomists, the latter who were employed in collecting, sorting, and identifying the specimens collected primarily by Malaise traps and leaf-litter catches.

A certain amount of trust was put into each participant that they would indeed take the time out of their busy schedules and volunteer their efforts toward fulfilling the objectives of the grant and describe the biodiverse taxa they stated existed in Fiji. For the most part, this trust was reciprocated by diligent reporting of the identifications of material they were being sent and in submissions of their manuscripts to the journal series created and dedicated to the Fiji project: *Fiji Arthropods*. But this diligence was not always the case. All team members were told they could participate in a trip to Fiji under the condition that they would submit before or soon afterwards a manuscript describing any new taxa discovered. Unfortunately in some cases, no such paper ever was forthcoming.

Table 1 shows the list of the target taxa of the Fiji project, the known number of species prior to the inception of the project, the estimated new taxa that would be found in Fiji, and how many new species were published or in press/in preparation since the Fiji project began. The names of specialists and their target taxa are not included but the numbers are real. Identifying those who did not meet their original expectations of the project by name or taxon is not the purpose of this paper. It is to illuminate the problem and offer a solution to it.

After not getting the number of manuscripts I had hoped for from some team members or even progress reports from them of what taxa had been identified by them, I began to think that the only reason some participants signed on to the project was merely to get a free trip to Fiji, soak up some sun, go collecting, go back to their labs with their booty, and reminisce with digital pictures and collected specimens of the pleasant 10–14 days they had amongst the warm climes and friendly people of that South Pacific island nation. This, of course, would not only be disingenuous to the project, but also to science. And especially to NSF and the republic of Fiji since the Biotic Surveys and Inventories program was created to conduct broadscale collecting, foster descriptions of new taxa, and require vouchering of specimens in the home nation. BS&I projects are essentially taxonomic capacity-building programs and they also assist with building infrastructure in-country where needed. Since the finances of the Fiji Government were such that they looked forward to and strongly encouraged outside funding to help such programs as ours in their country, our obligations and responsibility to the island nation of Fiji were immense.

TABLE 1. Original and Added* Target Taxa for the Fiji project.

Taxon Group**	Known Spp.	Estimated New	Described new or (In Press/in Prep)	Notes
A	40+	>15	0(0)	
B	10+	>10	2(3)	
C	5+	>20	0(0)	
D	5+	>10	4(2)	
E	40+	>10	0(0)	
F	50+	>10	0(1)	
G	50+	>50	0(0)	
H	20+	>50	10(15)	
I	20+	>50	3(0)	n. spp. described by a non-NSF participant
J	50+	>20	4(3)	
K	50+	>50	0(5)	
L	1	>10	3(8)	
M	20+	>50	0(0)	
N	1	>20	3(10)	
O	1	>50	0(0)	
P	20+	>20	0(1)	
Q	10+	>10	0(0)	
R	<5	>10	0(0)	
S	0	1	0(0)	
T	<5	>10	0(0)	
U	<5	4	4	all new spp. described

* added after project was funded but worked on by original NSF participants

** may be families, orders, or classes; 17 different taxonomists signed on to work on these 21 taxa (some working on more than one taxon group)

But all the participants in the Fiji project are good-natured and honest colleagues who were chosen not only for their expertise with their taxon, but because they showed a genuine interest in the Fijian arthropod fauna. What then could be the reason for their inactivity of some in publishing? Brian Brown [also an organizer of a NSF-funded BS&I survey: in Colombia] (2005) opined in his analysis that the lack of resources for Diptera taxonomists may have been the reason for so few papers on Neotropical Diptera being published despite the Malaise trap catches of his study and a few others showing the greatest diversity in insects being with the Diptera specimens collected. A paper written over 50 years ago (Hedgpeth *et al.*, 1953) essentially said the same thing. Apparently not much has changed. I agree that there is indeed be a lack of proper resources for taxonomists in some institutions and this has had a significant impact on the taxonomic productivity of many researchers, but this is not the only reason for so few papers being published.

In speaking with NSF staff and organizers of other BS&I surveys I found that the inactivity in publishing was found not only in our Fiji project but seemed to be an inherent factor in virtually every collaborative survey effort that had publications of new taxa as one of the expectations. If one agreed to do the work when signing up for a survey project, an organizer would expect that person to come through with the promised goods. However, this would not always be the case.

There was apparently a common symptom that pervaded a number of taxonomists preventing them from being productive in the publishing arena. Given this assumption, it would then seem that if true and affecting a significant number of taxonomists, it would have a resulting negative impact on taxonomic production in describing new species. Were employers and taxpayers then funding taxonomists to do only part of the job? Was the NSF-PEET program funding students to be trained in actually describing organisms or were they being trained to only go through a portion of the taxonomic process and then get stuck part way through?

Let's examine the Fiji project participant's productivity (or lack thereof in certain cases) and then follow along as I offer possible reasons for this inactivity and a step-by-step process that if followed by all taxonomists, will solve this problem.

The "Dog-Ate-My-Homework" Excuse and Other Syndromes

Factors to consider

Examination of Table 1 above shows a marked amount of inactivity by some project participants in describing the estimated new species. There are a number of factors that contributed to some of the inactivity, but not all of the inactivity. In prodding and querying team members on when they expected I might eventually see a submitted a paper, they offered a number of excuses: some reasonable, but others verging on pathetic and reminiscent of childhood excuses to their teachers for not turning in homework. It became obvious that publishing was a chore and not a priority for these latter cases. For them it was like having to eat your vegetables as a kid: Some kids ate them at the beginning so that the bad taste would not be the last taste in their mouth; while others opted to wait until the end because it the most horrible part of the meal and easiest to put it off as long as possible. I was apparently experiencing the latter school of thought on vegetable eating.

1. Reduction of project term

The Fiji project was originally proposed to NSF for three years. The grant was approved by NSF but the funding was reduced by about 30% from what we had originally proposed. It was decided that the best approach to still conduct the project with the reduced funding would be to reduce the term of the project from three years to two years. Although we met the project goals of a complete checklist, bibliography, database, and training of in-country students in those two years, the cutting back of one year from a three-year survey project ultimately had an impact on the process of identification, description, and publication of new species. Yet, this cutback apparently impacted only some, because others were obviously not impacted at all and were able to publish quite effectively.

The publication process usually involves a number of months of review, editing, and printing before publication. Knowing this and that we had a one-year reduction in time, it was decided to create a peer-reviewed journal series dedicated to the project and edited and reviewed in the same expedited manner as *Zootaxa*. This allowed a remarkable successful publication of 6 issues of *Fiji Arthropods* wherein were published 22 papers by 15 authors describing 62 new species from Fiji and related regions in just two years, whereas only a fraction of these papers and resulting new taxa might have seen publication under a more "normal" journal process.

2. Unforeseen obligations

When signing on to the Fiji project, one must assume that those participants agreeing to collaborate all had every desire to contribute to the project in as full a capacity as their time allowed. However, in the time between submittal of the proposal and the notice of award from NSF (about 5-6 months), some of the participants discovered that they had other grant obligations, family obligations, large book projects, or sabbaticals that took them away from the Fiji project. In most cases, these absences from the project were for a few months to a year, but not the full two years. Thus, one would still expect at least a portion of the original estimated expectations from these participants.

The Real Reasons

Of the original 19 participants who agreed to collaborate on the project, I analyzed the publication output of five who I categorized as having little or no excuse for not publishing in order to ascertain if there was a pattern in their lack of productivity. I searched *Zoological Record* for the years 1997 to 2006 inclusive to find their relative taxonomic productivity in the last 10 years. The results are presented in Table 2. Authorship of papers was recorded only if they were senior or sole author of a taxonomic paper to reduce any possibility of giving undue credit to someone for possibly attaching their name onto someone else's taxonomic work. There was only one junior-authored taxonomic paper found for these five people, and was ultimately of little impact to the overall analysis.

TABLE 2. Ten-year taxonomic productivity of 5 original Fiji project participants from 1997–2006.

Scientist	Papers published	New Taxa published
A	0	0
B	0	0
C	1	6
D	2	1
E	1	0
totals	4	7

The results of the analysis in Table 2 show essentially an average of less than half of one paper per ten years per person and also less than one new species described per ten years per person. Surely this negligible effort is not doing much at all to help solve the taxonomic impediment.

That small fraction of participants in the Fiji project in Table 2 who were slow to publish on the new species found during the survey are, I contend, victims of the taxonomic process and their own addictions to the "hunt" [= collecting], "discovery" [= sorting of new taxa], combined with an avoidance of "eating their vegetables" [= i.e., having to sit down and do the humdrum work of describing a species]. They followed the steps outlined below but would ultimately get stuck at one point and would not be able to progress further. Going out and collecting and even sorting and finding new taxa was reward enough for them. The drudgery of having to write and/or type up a decription was the smallest blip on their radar screens — or it wasn't even present. Constant prodding sometimes moved the description of a new species up the priority list for some, but for others, no amount of prodding or gentle persuasion would budge that person beyond the early steps — thus, they would unfortunately fail in completing the steps in the taxonomic process.

So, what are these steps? I call them the *Eight Steps to Enlightenment and Taxonomic Nirvana*. That is, if one follows them all, there is no doubt that the gods of taxonomy will be looking kindly upon them for achieving success and helping fill in the jigsaw-puzzle picture of life on this planet. With constant taxonomic productivity, that picture will become more and more complete.

The Eight Steps to Enlightenment and Taxonomic Nirvana

1. Realizing and embracing the **enjoyment of nature**
2. Realizing and embracing the **enjoyment of collecting**
3. Realizing and embracing the **enjoyment of sorting**
4. Realizing and embracing the **enjoyment of the discovery**

5. Realizing and embracing the **enjoyment of researching taxonomic literature**
6. Realizing and embracing the **enjoyment of describing**
7. Realizing and embracing the **enjoyment of submitting your manuscript for publication**.
8. Realizing and embracing the **enjoyment of educating others**

The Step-By-Step Process

Step 1. Realizing and embracing the **enjoyment of nature**.

This is the critical first step in the process. If one does not like nature, there is definitely no future for that person in taxonomy. Most who fail at this Step ultimately become accountants.

As biologists, we should all be able to achieve this Step with no problem. We appreciate our surroundings and ask questions about them, we are normally curious at how things work in each ecosystem, and we generally embrace and enjoy the complexity and beauty of the world we live in.

Ways to Success: A normal first thing for most taxonomists to do at this step is to select an area in which to explore and discover, travel to, and arrive at this particular area. Often these areas will be unexplored or little-explored areas, or they may be areas that are known to harbor an unusual organism or a great abundance of different organisms.

Hedging at This Step. Reading about an area and not physically visiting it does not necessarily qualify as properly completing this step. However, vicarious pleasures are the only way for some folks who do not or cannot leave the lab yet they still adequately complete the later steps in this process.

Step 2. Realizing and embracing the **enjoyment of collecting** specimens.

This is the "exploration" step of the process. Sociologists have pegged most of us humans as instinctive "hunters" so collecting is essentially the "hunt" our ancestors HAD to do in order to survive. Some of us are better hunters than others. Those that aren't no doubt become scientific illustrators or molecular biologists ....

Ways to Success: To successfully complete this step, one must set up a trap, use one's hands, or use a tool in order to procure said organism. For botanists, this is most often ripping a plant away from its substrate and placing in old newspapers or small envelopes. For zoologists, tools are normally used to immobilize the organism because the hunt involves a prey item that moves and has what is called an "avoidance mechanism" --and they usually move away rather quickly from someone trying to remove them from their native habitat and/or end their life. Of course, those zoologists who work with the more lower evolved organisms like amoebas are dealing with beasts that have avoidance mechanisms pretty much along the same lines as plants, so collecting them can be just as onerous as it is for the botanists.

Hedging at This Step. Sending out a team of collectors to do the job for you. It works — and many collectors in the 18th and 19th centuries did this (and some today use indigenous peoples who know their land and biota better than the adventurous collector to get the good stuff for them) — but to truly understand your quarry, it is best for you to do the job yourself. Again, there are a few who do not or cannot leave the lab for various reasons, physical or mental, yet they do successfully complete the subsequent Steps in this process.

NB: Some self-proclaimed "taxonomists" incredibly stop at this step. However, this is abnormal behavior, as most will be curious as heck as to what they collected, will fidget nervously, have sweaty palms, and will quickly move on to Step 3.

Step 3. Realizing and embracing the **enjoyment of sorting** species that have already been collected, whether by you or others.

After completing Step 2, one takes the harvest back to the lab and dumps it out to be sorted and properly curated. This is the step of "discovery". The anticipation of finding something new is the drug that fuels the otherwise monotonous activity of sorting. For the collection of large vertebrates and many plants, the sorting may even take place in the field and it is merely the proper labeling and tagging and preservation that takes place in the lab. But for the invertebrate zoologist or other biologist dealing with droves of biodiversity, the sorting is delving into the unknown (whether it be a Malaise trap residue or a net full of marine invertebrates) and sorting and identifying the critters that one has collected.

Sorting can be quite a heady step to overcome and many taxonomists fail to get beyond this step. It is fraught with addiction. There HAS to be something NEW in this batch ... or the next batch ... or the next ....!!!

If a taxonomist has an *a priori* hypothesis that unknown species X of genus Y MUST occur in a particular area and years and years of high-volume trapping such as with Malaise traps has taken place, there are known cases where that taxonomist has never come out of the lab to see daylight until that danged new species turns up. It may take years. And in some cases it has taken even longer.

Ways to Success. Aside from the anomalous taxonomist who likes nothing else than sorting through specimens in hopes of finding the new and unusual, this is an easy Step to complete for most. There are some who abhor the sorting process (see Hedging below) and would rather have someone else do the "dirty work"; but for the most part, the natural curiosity that drives most biologists allows one to easily complete Step 3.

Hedging at This Step. Having someone else do the sorting for you. This is true of many professors who have a large pool of students from which to tap to do this laborious chore of sifting through numerous uninteresting organisms in search of something worth screaming about. Granted, researchers and professors are often more highly paid than students, thus this can be a very cost-efficient way of moving through this step. It is not necessarily condoned by this author, but it is understood that finances often dictate how a job is completed.

Problems at This Step. There is the mindset of some that sorting is the ultimate activity. There is always the goal in the back of that person's mind that if they find something new and unusual, they will be admired and adored by colleagues and may even get a patronym out of it. Thus, they are either always stuck here or at the next Step.

Step 4. Realizing and embracing the **enjoyment of the discovery** of new or rare species from your efforts at sorting.

Finding a new taxon can be a most rewarding experience and the thrill to some taxonomists is such that they cannot wait to put a name on it, describe it, and see their description in print. One would presume that the amount of the thrill would be proportional to the size of the organism discovered. Considering that the larger vertebrates are more well-known than their tinier invertebrate cousins, finding a new bird or mammal is indeed a rare and exciting event. Yet, the thrill is just as keen for the worker of the more abundant insects and other invertebrates. Even in the most biodiverse taxa of insects there is a thrill to finding something new — but it is usually not finding just one new taxon but a dozen or so at once that does the trick. Or else it is finding a new genus or family or even order of animals or plant that can elicit an adrenaline rush rather than the find of a singleton not previously described.

Ways to Success. The best way to blaze through this Step is to either have an incredible knowledge of all described taxa you are working on, or have good keys prepared that help you verify whether or not it is in fact new.

Hedging at This Step. Probably the worst thing that one can imagine that is done at this Step is to exclaim that one has found a new taxon just merely to say they have found it when in fact they have not. I'm not talking about a find that is honestly thought to be new and subsequently found to be a junior synonym of something previously described. No, the worst case scenario here is the premeditated manufacture of something exclaimed to be new when it is not. It works best in taxa not studied again by anyone else for decades so that the fraud is not discovered until well after said taxonomist has left the earth. It unfortunately has happened.

Step 5. Realizing and embracing the **enjoyment of researching taxonomic literature** related to your new discovery.

Having all the literature of your taxon under study is essential to completing this Step. One cannot confidently say they have something new to describe if they do not have the original descriptions of related taxa or keys to those taxa to use for identification and comparisons. Combined with this is the oft-time necessity of examining types of related taxa to be sure your taxon is indeed something new to science.

Ways to Success. Having all this ready to go when you are at Step 4. Doing it here is the vetting process that assures you have a new taxon, but having the literature already at hand during Step 4 allows you to jump past this Step and on to Step 6.

Hedging at This Step. There really is no 100% successful hedge here. If you do not feel having the literature is necessary, you ultimately become vulnerable to a potential junior synonym. It's the gamble you pay.

Step 6. Realizing and embracing the **enjoyment of describing** and illustrating these new species.

This is the sit-down-and-describe-what-you-see (or, for the blind, feel) Step. Description and naming of your new taxon is essential to disseminating and communicating with others what is out there. An illustration is an added benefit to aid future researchers in identifying what you have described.

Ways to Success. To ease the "pain" of describing more than one taxon in a group with many new taxa, one can create a template description that only needs changes at various parts when the taxon being described differs from what is in your template. The advent of digital photography has made many illustrations unnecessary in some cases and has thus expedited the descriptive process.

Hedging at This Step. Describing the minimal amount of information to be legal according to each biological Code. For example, in zoology, one only needs to describe characters that differentiate one taxon from another. At a minimum, one could theoretically say "Yellow, 20 mm long" and that would validate the description and naming of a new taxon. Although of no real benefit to others as it does not convey all of the characters of the taxon being described, it has been done.

Step 7. Realizing and embracing the **enjoyment of submitting your manuscript for publication** of these new species and completing the publication process.

This critical Step is the final one that validates your description. Publication in a peer-reviewed journal is optimal. Review and certification by ones colleagues is the ultimate test of one's description.

Ways to Success. There are many journals now that offer expedited publication yet still adhere to peer-review. Other journals that take a bit more time from manuscript to publication may offer benefits other than speed, such as free color, or the prestige of a being published in a high-impact journal.

Hedging at This Step. Self-publication. It speeds up the process but avoids necessary feedback from colleagues who might assist by letting you know that you are publishing something that has already been described. Also, tacking one's name onto a paper done primarily or worse, solely by someone else. It gives you unwarranted credit for doing taxonomy when you really haven't.

Step 8. Realizing and embracing the **enjoyment of educating others** to your new discoveries

Your publication being read by others is the primary education that is done at this step. But added value comes from every taxonomist who passes on information to others by educating them in any way possible to the uniqueness, wonder, or biodiversity of the groups that they work on.

Ways to Success. Give lectures to the public and make your publications available for free via pdf or online in some other form (subject to copyright of the publisher).

Hedging at This Step. Publishing in obscure journals or self-publishing and not making reprints available to others. This is done primarily by those who only want to see their name in print and really do not care about educating others in what they do or the organisms they study.

Summary

It is apparent that some taxonomists are as not as productive as others, and some, who may have published early in their careers, just plain stop publishing or put their name on student's papers to keep their "name alive". There are numerous legitimate reasons for this inactivity — most having to do with squeezing their taxonomic research in between other obligations (administration, bioinformatics, phylogenetic analyses that do not name new taxa, non-taxonomic research, teaching loads, travel, meetings, etc.). However, there are some researchers that do not have any of these excuses, yet still are labeled as taxonomists and included among the number when we account for what expertise we have taxonomically in various areas. These "taxonomic deadbeats" are content to either collect, or sort, or both, but reluctant to sit down and crank out the written results of their discovery of new taxa and give them names and publish them. Thus, they are not truly taxonomists, but highly paid biological technicians, the latter who can essentially do those same tasks of collecting and sorting but at a lower pay or for free. However, by not publishing the results of their discoveries, biology as a whole loses out because of their not making public what they know is new. The quote at the beginning of this article by Christopher Columbus scholar Mauricio Obregón says it best. Essentially, a discovery is not a discovery until it is made public.

If we are to solve this taxonomic crisis, there are apparently two taxonomic impediments to overcome: 1) to increase our base of taxonomic expertise to handle the biodiversity that exists yet to be described; and 2) to get those already trained as taxonomists to get beyond Step 3 or 4 and publish their findings.

I've outlined the steps that need to be taken. All that is necessary now to achieve what I term "Total Enlightenment and Taxonomic Nirvana" is the discipline of each taxonomist to live up to their professional label.

Acknowledgments

I thank Dan Bickel for numerous discussions on this topic as we worked together to successfully complete the first two years of the Fiji project. An early iteration of the subject of this paper was prepared as a PowerPoint presentation destined to be made public at the annual Entomological Collections Network meeting in Ft. Lauderdale, Florida in November 2005. Unfortunately, Hurricane Wilma caused enough damage to the convention center in Ft. Lauderdale and surrounding hotels to postpone the meeting one month, which resulted in a no-show of this author and the presentation. However, the PowerPoint can still be downloaded from [http://hbs.bishopmuseum.org/fiji/ppt/nirvana.ppt]. Allen Allison, Tim New, Dan Polhemus, Jim Carlton, and Dan Bickel are thanked for suggestions that helped improve the paper. The National Science Foundation is thanked for their support of the Fiji Terrestrial arthropod Survey project DEB-0425970; however, all opinions here remain solely those of the author.

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MINNESOTA MUFON

Newsletter

From the State Director

This month I will summarize Michael Strainic's presentation at last year's MUFON Symposium entitled ***Ufology in the Great White North.*** His interest in UFOs was aroused at age three when he saw photos of UFOs in a magazine. Strainic serves as National Director for Canada. He believes what we are seeing is not necessarily what we are getting. Too many incidents appear to be staged events, staged either by the phenomenon, or by the intelligence community. We have been looking at a rich variety of masks for decades, but probably have yet to see the real face behind the mask. His talk highlighted both historic and modern aspects of the UFO phenomenon in Canada.

The Airship Wave of the 1890s was documented both here and in Canada, with British Columbia having a large number of reports. At that time, a balloonist named Andre was attempting to balloon from Norway to the North Pole. Many sightings were assumed to be of the Andre balloon. But one newspaper made note that many reports of an object over north British Columbia could not have been Andre because accounts from Norway stated he had not yet begun his journey — and was thinking of postponing it until the following year!

Some of the objects didn't really behave as expected of a balloon. One object was reported to have paused above a mountain peak, then made seven wide circles in the sky before finally speeding off in a straight course. Several sightings are described in detail, including one from which a shower of sparks seemed to drop like the sputtering of an arc light. Airships were absent from Canadian skies from 1898 until 1908 when additional sightings were reported. In 1915, an object dropped three balls of fire into the St. Lawrence River. This event led the police to order a blackout of Ottawa. Apparently believing that enemy aircraft were involved, marksmen were dispatched to the roofs of government buildings and ordered to shoot down any aircraft approaching the city. The expected invasion never took place and Ottawa citizens later laughed at this "scaroplane" scenario as a case of war nerves!

Students of UFO history know of a scientist named Wilbert Smith, who had been responsible for engineering everything concerning the use of radio in Canada. He had an interest in UFOs and proposed to the Department of Transport to establish Project Magnet. Smith believed that work in geomagnetics would be the link between our technology and that of the saucers. He wanted to study how magnetic and gravitational principles might account for UFO flight characteristics.

cont.

Minnesota MUFON Meetings

Saturday, July 13
and
Saturday, August 10

Science Museum of MN
Computer Education Center
American Bank Bldg
101 E. 5th St., Suite 1900
19th Floor

SEE MAP ON COVER!

PARK FREE
Ramp Entrance is on Minnesota St.
Proceed to 5th Level

Because this is a secured building, to gain entrance you must be at the ramp door between 1:00 and 1:30 PM. Someone will be on hand to activate the elevator to take you to the meeting room. The next admittance time will be at the 3:00 break.

Don't be Late!

The building and ramp areas are designated as Non-smoking. Coffee and soft drinks are FREE!

pens that Smith sent a memo 1950 to the Controller of Tele- nunications proposing to officially study UFOs. In the memo, he wrote that he had learned from Dr. Robert Sarbacher in Washington DC that the matter was the most highly classified subject in the US government; that their modus operandi was being investigated by a small group headed by Vannevar Bush, and UFOs were considered by authorities to be of tremendous significance. In 1953, Smith filed a report which said, in effect, that there should be a substantial effort toward acquiring as much as possible of this technology. Three months later, a flying saucer sighting station was operational ten miles from Ottawa. A gamma ray counter, a magnetometer, and gravimeter were in place. In August, 1954, the gravimeter recorded a disturbance, but no visual confirmation was made. Two days later. Project Magnet was shut down. Several reasons were given, but they did not include lack of results.

Then Smith began hosting meetings of an informal Flying Saucer Club. One night he took a break and went outside. A small spacecraft was hovering over the front lawn. For the next few years the ground beneath was scorched into sterility down four feet to bedrock. Smith's son later recalled that small spacecraft, monitor units, would perch in trees near their home. Leaves and branches would be scorched so that new leaves would not appear for a couple of years. They believed that the club was being monitored. [(New readers should understand that there has always been nonsensical and deceptive behaviors surrounding this phenomenon. The question may not be whether or not they were being monitored, but rather why the phenomenon wanted them to think they were. —Moss] Smith died in 1961.

The 1970s Fuhr case from Saskatchewan is well-known. Edwin Fuhr was swathing his field when he spotted five aluminum-colored domes spinning just above the ground. They rose into the air, assumed an echelon formation, emitted some smoke, and flew away. The swirled circles they left behind would be better described as "saucer nests," and not as crop circles.

Another high-strangeness event took place in Williams Lake, BC in 1990. A woman found a 39 foot ring pressed into her dirt driveway about one inch deep. Some of the rocks had been crushed and some had been driven flush into the ground. The ring was six inches wide. It was twelve feet from the house and had centered itself perfectly within the limited area of the yard. This had happened around 5:00 PM. Later, at 4:30 AM, a huge cone of red light was seen hovering over an apple tree in their son's yard next door. After about twenty minutes it left. The next day they found that every apple on the tree was gone! No apples were on the ground, no broken twigs, and the tree had not been damaged.

Strainic told of several crop circle situations with accompanying phenomena. There were reports of dizziness and nausea when in the proximity of the circle. Dogs would bark excessively prior to the discovery of a formation. While investigating one formation, it was noted that Canadian geese were feeding in a field nearby. Various sized groups would leave the big flock and head for a destination that would have taken them directly over the formations. But they would always detour around the circle and continue on their course. Sometimes a small group would split up with some going to one side, and others to the opposite side of the formation, before joining up again. No goose ever flew over the formation. Odd sounds were also heard, such as that of a seemingly huge bird flapping its wings, or the sound of footsteps. But nothing was ever seen.

Canada also has its share of animal mutilations, sometimes with an odd twist such as internal organs that have been liquefied. A flattened porcupine was found in one crop circle. Its quills were arranged in a way that suggested they had been swirled by the same force that had affected the wheat. Quills and wheat were intertwined. A porcupine can weigh as much as *sixty pounds*, so the force that flattened it down to a one-to-three inch thickness must have been considerable.

In another case, a farmer's blind Blue Healer dog had disappeared in August and was found in October near a circle in a flax field. The dog's head was missing and later found about 200 feet north of the body. Strainic said that flax is very dense and difficult to walk into, yet this blind dog had walked a quarter mile into it. This circle was part of a group of six circles located close to the house. All were only ten feet across. Nothing had been seen or heard.

Finally, there is the Shag Harbour, Nova Scotia case of 1967. At 11:00 PM on October 4, a sixty-foot diameter UFO was seen hovering over the water near this fishing village. It then dropped rapidly and hit the water producing a bright flash and explosive roar. Witnesses called the RCMP office, thinking a plane had ditched into the harbor. When they arrived, the object was still on the water. It was glowing yellow and producing a yellow foam. Then the object went under. The sulfur-smelling yellow foam continued to well up from the point where the UFO sank and a slick developed. Seven Navy divers searched during daylight hours. Five days later the search was canceled.

As always, the full text of the presentation contains much that is not summarized here. Consult a copy of the 1995 MUFON Proceedings for Michael Stainic's full account.

Dick Moss

e UFO Phenomenon nd The Scientific Method

by Craig R. Lang

During a recent discussion with another MUFON member the question arose of "what exactly is science?". In the context of the UFO phenomenon and related anomalies, the concept of "science" is not always well understood. Thus, in my view, this question is one which cuts to the core of UFO investigation.

Science is just one discipline which attempts to deal with the UFO phenomenon. Other areas, such as the new age movement, spirituality etc. have their own sets of rules and beliefs. While I do not wish to dispute their beliefs, I suggest that we need to clearly distinguish between the discipline of science and any other approaches.

I suggest that overall, conservatism in science is good. The burden of proof is upon *us*.

Science has the criteria that it deals strictly with assertions that can be verified by experiment. To overcome the "giggle factor," UFO research must conform to this criterion, perhaps even more closely than other more established areas of science. This article addresses some of these areas and looks at how UFO research can (and often does) use the practice of "good science" to discover the truth behind the mystery.

How is Science Done? The Scientific Method

First of all, what is science? Fundamentally, science is a formalized process for discovering the nature of the world around us. It is based upon the idea that the nature of the world can be understood using rational, systematic inquiry. By reasoning, observation, and experimentation, we can construct — then validate — a model of reality that closely approximates the real world.

By definition, a scientific investigation is one which follows the scientific method. This method is described in several different ways, depending upon which text one reads. For instance, in the Bear, Connors and Paradiso, text, *"NeuroScience,"* the scientific method is described as consisting of the following components:

- **Observation:** Data is gathered about a phenomenon by experiment, field observations, etc.
- **Replication:** The observation must be reproducible to verify that it was done correctly and to show that there are not other possible factors accounting for the data.
- **Interpretation:** Data from the observations is interpreted in the context of current knowledge (or lack thereof...). The hypothesis may be confirmed, revised or disproved based upon the data. *(Note: This is the one step of science which is the most vulnerable to human failings.)*
- **Verification:** Other experiments which may or may not be similar can be performed to confirm or revise the hypothesis. ***This is the all-important step distinguishing science from other fields. All experimental results must confirm the theory, or the theory must be revised.***

Another view of the scientific method is described in W.I.B. Beveridge, "The Art of Scientific Investigation". In this view, scientific investigation is a progression, based on observation and experiment, from initial observation, to hypothesis, to theory, to law of nature. Scientific investigations generally follow this progression, often over many years, or even many lifetimes, and often backtracking in the face of new evidence.

A scientific investigation usually begins with initial observations or experiments, which are interpreted to develop one or more theories of the phenomenon in question. A testable hypothesis is developed, which can be verified by an experiment. The hallmark of a good hypothesis is that it can be used to derive a prediction. It is best when multiple hypotheses are developed making differing predictions which can then be confirmed or refuted by experiment.

An experiment, or other means of observation, is then performed. The analysis of the results either confirms or disproves the predictions of the hypothesis (or sometimes results in a surprise). Conclusions from interpretation of the results usually suggest further tests of the theory giving rise to the hypothesis. Usually verification of a theory is the result of a series of experiments. Conclusions are re-verified by still more experiments, ad infinitum.

Science, Politics and the Mainstream

By nature, science is conservative. For every new assertion there will always be skeptics who demand compelling evidence. This has the advantage of preventing "erroneous science" from making it into the mainstream, but it has obvious disadvantages for the studies of UFOs. Still, I suggest that overall, conservatism in science is good. The burden of proof is upon us.

Unfortunately, scientists are human and are subject to human failings. Few, scientists included, are willing to easily give up a comfortable world view even in the face of solid evidence. It is often easier to overlook the new evidence - even if it is ng. Thus, data at variance to prevailing view is unfortunately sometimes rejected for other-than-scientific reasons. This is a problem that anomaly researchers will always have to face. At present, probably the best that we can do is to conform strictly to the scientific method, offer compelling evidence, and let a gradual paradigm shift take its course.

Applications to UFO Studies

UFOs, by nature, do not lend themselves to laboratory experiments. Therefore, we have to settle for field observations during sightings. This means that the key difficulty in UFO studies is the inability to reproduce results — a fundamental requirement in understanding any phenomenon. However, the problem is no different for UFO researchers than it is for those studying earthquakes, weather, or other sporadic phenomena. We "merely" require a reliable means of recording the phenomena whenever it occurs, for later analysis.

Skeptics require compelling evidence and I feel that the "smoking gun" does not yet exist to explain the UFO phenomenon. Still, events such as radar/visual cases, ground traces and multiple witness sightings have provided evidence — often quite convincing. While this is encouraging, to me the evidence remains ambiguous.

A key to understanding and verifying the phenomenon will probably lie in rigorous and extensive data-gathering, such as is increasingly being done by UFO research organizations (MUFON, CUFOS, etc.) From this, there are possibilities for statistical analysis of sightings data, analysis of ground traces and artifacts, etc. Objective "experiments" such as instrumented skywatches (such as those in Gulf Breeze, Florida) using formalized procedures should also be considered.

By analyzing the data we can draw general conclusions about UFOs such as size and shape distributions, flight dynamics, descriptions of entities, etc. We can characterize the general behavior of UFOs (and their presumed occupants). We can then use this characterization to form hypotheses which hopefully, we can find some way to verify.

After many years of research, we are still only acquiring and analyzing initial data. The field of UFO studies is still just beginning to form hypotheses of explanation. At present several theories exist to explain the UFO phenomenon: The nuts-and-bolts ET hypothesis, spiritual and inter-dimensional interpretations and more skeptical views. However, at this stage, it does not seem to me that any of these ideas are verifiable. I suspect that eventually a testable hypothesis will be confirmed by a combination of observation and compelling physical evidence. But we have a long way to go and a lot of science to do before this phenomenon is accepted as scientific reality.

Craig Lang

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1) W.I.B. Beveridge, "The Art of Scientific Investigation"
2) Bear, Connors and Paradiso, "NeuroScience, Exploring the Brain"
3) Paul Davies: "The Mind of God, The Scientific Basis for a Rational World"
4) J. Allen Hynek: "The UFO Experience"
5) Paul Hill, "Unconventional Flying Objects, a Scientific Analysis"

* * *

Field Investigator Group Update

by Craig R. Lang

Over the last couple of months, we have had an encouraging upsurge of people interested in doing field investigator work. Since this is one of the primary reasons for the existence of MUFON, we want to encourage this as much as possible. We have just begun the process of training a new group of investigators (myself included), and setting up an investigator network.

An interest sheet has been posted at the last Minnesota MUFON meetings. If you are interested in field investigator training, or would like to help set up our field investigator network, please sign up on this sheet at the next meeting, or contact:

Craig Lang,
Home: 612-560-1532,
Work: :612-572-5035,
e-mail:
craig.lang@medtronic.com

Field Investigator Study Group

The first step is to get as many people as possible to pass the MUFON Field Investigator's exam. To that end we have set up a field investigator study group. We plan to meet in June and July on the dates of Wednesday June 12, June 26, July 10 and July 24. The meetings will be at Craig Lang's house at 7:00 PM. We currently have six people signed up for this group.

Since we all have diverse schedules, and live in diverse locations, there will be some people who will be unable to attend the sessions we have set up. For those people, a second study group can probably be organized (as of this writing one may

but I am unaware of it).
me if you are interested.

Tentatively, we envision going through the 100 question field investigators exam, looking at approximately 25 questions each session. In addition we can look at pertinent aspects of the manual, or other related literature as needed. We are always open for suggestions/ideas.

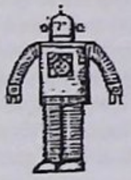
Everyone attending the group should have a copy of the MUFON field investigators manual — and should read it. You'll also need a copy of the test. Call Joel Henry at 431-2426 or Tim Watts at 985-5747, or contact me if you need a copy.

Organizing the Network

This is the hard part. Work is just beginning in this area and we are open to suggestions. In my view, the prime need is to establish a cadre of available field investigators, and to develop close ties with law enforcement authorities and the local/regional press. Kathi Hilton has begun to work on this aspect of the effort. For more details, or if you'd like to volunteer your assistance, Contact her at
612)484-6492,
E-mail: kathi.ts@ix.netcom.com);
or Dick Moss at 612-732-3205
or me at 612- 560-1532.

Setting up the network should be our next priority. Our end result should be a group of trained, credentialed investigators, along with a means of rapidly alerting them to current sightings.

Happy Investigating!



UFOs in Elementary School? You bet!

"How much is $1 billion?" asks Bob Schultz. The 14 fifth graders react loudly when he pulls a stack of 100 $1 bills out of his briefcase.

He asks one student to measure the stack's height, and then proceeds to take the class step-by-step through the necessary mathematics to reach the conclusion that a stack of 1 billion $1 bills would be 78 miles high.

"Half the way from here to Duluth," says Schultz.

Billion-dollar budgets, spy rockets, alien saucers, men on the moon. These are just some of the topics Schultz covers during his 10-week mini-course at Pike Lake Elementary,. "The science, politics and history of UFOs." Ron Sweeley, a fifth grade teacher at the school, encouraged Schultz to teach the class on a volunteer basis.

Schultz's class about UFOs has generated substantial interest among the fifth graders. Because of limited space, only the first 14 of the 60 students applying for the class were admitted this spring.

Schultz taught the first UFO class last fall. Because it is an unusual subject matter for young students, he requested that parents attend with their children. In some ways, this made the first class more productive because it stimulated discussions at home about the topic.

"One parent came up to me in a store and told me that her daughter guarantees that she's going to be an astronaut, and that she's bought the telescope and is doing ground training because the class captured her imagination."

In fact, current students are so intrigued they would like to start a UFO club. Schultz, a retired electrical engineer, says this is exactly why he became a volunteer in the schools.

"I tell kids to not just believe everything I say, but rather, do their own research. I always say to them, that they have three choices: to believe, not to believe, or think *maybe*."

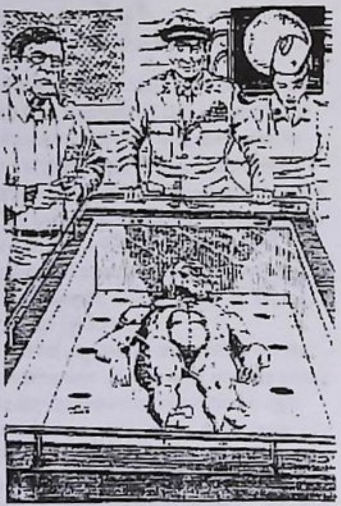
With the help of magazine articles, simple science experiments and videotapes, Schultz talks about the science of flight, chemistry, physics, astronomy and mathematics.

"I want to teach them that science is a neat thing," he says. "That there's a lot more out there than you know about. I want to encourage them to strike out on their own."

By exposing the students to some of the complexities of science now — such as velocity formulas and the theories behind anti-gravity flight — Schultz says he hopes they are not intimidated by it in the future.

Actually, I can't believe all the stuff they get," he says. "The kids will surprise me. Last week, three students came to class with library books on related topics that they had looked up and found."

Bob has been asked to add a second class in the fall of this year. Needless to say, he's thrilled that the class is drawing so much positive attention, and who knows... He may be responsible for a whole new crop of budding field investigators! *Well done, Bob!*



Wes Crum©

Remote Viewing and Cosmic Voyage

by William I. McNeff

The validity of remote viewing, especially *"Scientific Remote Viewing"(SRV)* as described in the book, *Cosmic Voyage —A Scientific Discovery of Extraterrestrials Visiting Earth*, by Courtney Brown, Ph.D., is potentially of great importance. If SRV does not work, or does not work anything like as well as Brown says it does, then the book is worthless, and the ufological and scientific communities have lost a potentially useful tool. Therefore, I have expended some efforts to evaluate the validity of remote viewing, and SRV in particular, which includes reading the latest Journal of Scientific Exploration.

First, I would like to recount my personal experience with what I believe to have been a form of remote viewing (RV). Those who have studied RV have found evidence that it works going either forward or backward in time. Quoting from my diary of Tuesday, August 7, 1984: "*...[early] this morning...I had a vivid dream. My mother was...in the living room in the old house on the hill*" (the family farm in Nebraska). In my dream, my mother was sitting in a chair, when she slid out of the chair and to the floor so that her feet were touching or entangled with the pedals on the piano. This dream was so vivid that "*I awoke and checked the time, because I wondered if my mother had actually died and this was a message. I told my dream to Larry* (a friend at Control Data) *this morning, and he was alarmed by it. He told me of a precognitive dream or vision which he had several years ago... Early one morning, he awoke crying and said 'Mr. G. (a friend who lived nearby) is going to die of cancer!' His wife witnessed this. Later in the day, she phoned to say that Mr. G. had taken* sick suddenly and had been taken to the hospital. Within two or three days he died, from abdominal cancer.

He (Larry) *also told of a vision of a friend of his, lying in a bed in a white nightgown in a room furnished only with a night stand. A phone call to his friend confirmed this: the room had been emptied for re-decorating."*

The next entry in my diary is for August 9, Thursday: *"My father phoned this morning and told us that Mark* (my nephew) *had been killed in a tractor accident. Another nephew, Ken, had been driving the tractor, packing the silo...after dark. Mark had stopped on his way home from his job* (to see Ken, and was riding on the tractor with Ken). (The silo was on above -the-ground type with concrete walls about 15 feet high.) *The tractor [slipped sideways and] fell off the wall and killed Mark instantly. Ken is injured."*

Those who have studied dreams tell us that much of what we see in our dreams is symbolic. I believe the accident that my mother had in my dream was symbolic of a family tragedy — the loss of a child — because she had already experienced such a loss — a daughter had been stillborn. It has been theorized that the emotion from such an event can cause a harbinger of the event to project backwards in time. There were elements in the dream that corresponded to elements in the accident: the chair (tractor seat); a fall, and pedals (the clutch and brake pedals on the tractor). Of course, I may be reading too much into those elements, but it is clear to me that Larry and I recognized the dream as having to do with death. These three incidents, along with others, pretty well convinced me that remote viewing is a reality.

Early last fall the CIA announced that it had convened a scientific panel to review experiments in remote viewing that it had sponsored. I now quote from the Journal for Scientific Exploration, Vol. 10, No. 1:

The extent of government-funded psychic remote viewing research has been a long-standing topic of speculation. The declassification and release of a 270 page SRI report (out of an estimated 80,000 pages of program documents that remain classified) and the commissioning of a retrospective review of these programs...finally resulted in at least partial public disclosure of these 24-year long efforts that took place at SRI (1972–1990) and later at SAIC (1990–1995). The outcome of the CIA-sponsored review was unusual in that two reports were issued — one by Prof. Jessica Utts, a statistician at the University of California, Davis, and one by Prof. Ray Hyman, a psychologist at the University of Oregon — which came to opposite conclusions concerning the underlying reality of so-called psy phenomena. We also note that the director of the SAIC effort, Dr. Edwin May, has raised serious criticisms concerning limitations on information made available to or allowed to be used by Utts and Hyman by the CIA.

Now, really! Are we to believe that the CIA sponsored this research for 24 years with only negative results the whole time? If true, this would call into question the judgment of the CIA program managers. The articles in the JSE make it plain that the program had some remarkable successes. For example, in an article by Harold Puthoff (p.75):

"With regard to admission by the government of its use of remote views under operational conditions, officials have on occasion been relatively forthcoming. President Carter, in a speech to college students in Atlanta in September 1995, is quoted

by Reuters as saying that during his administration a plane went down in Zaire, and a meticulous sweep of the African terrain by American spy satellites failed to locate any sign of the wreckage...The head of the CIA turned to a woman reputed to have psychic powers. She gave some latitude and longitude figures. We focused our satellite cameras on that point and the plane was there."

Per the JSE, a recently unclassified report (Mumford, *et al.*, 1995), concerning a remote viewing program called Star Gate, cites the role of the CIA and DIA in the program, including acknowledgment that a cadre of full-time government employees used remote viewing techniques to respond to tasking from operational military organizations.

Another startling success for remote viewing (JSE, p.87) concerned a Soviet complex, apparently concerned with research on beam weapons. Viewer Pat Price sketched a giant gantry crane at this site, getting the number of wheels (eight) correct as well as the general shape, and describing a huge steel sphere being welded together in sections *inside the building* — out of view of spy satellites. This was not known to the US until two years after Price's death. Price had the diameter of this 60 foot sphere correct to within 18 inches.

But in spite of all the successes, there were political reasons that the CIA did not want the responsibility for the remote viewing research when asked by the DIA. They had just had a huge operational and public relations failure in the Alrich Ames scandal. Also, it appears that the CIA was and still is secretly using remote viewing. By publicly pooh-poohing remote viewing, the CIA could attempt to prevent knowledge of the program by potential adversaries, while still being able to us RV for intelligence purposes. Finally, the research program was badly mismanaged and made ineffective under the DIA, for reasons too complex to go into here. (See JSE, p 105)

The CIA "stacked the deck" for their "scientific" evaluation panel. In his report, Ray Hyman says "Our evaluation will focus on the ten experiments conducted at SAIC." This is the typical procedure of excluding data which might prove exactly the opposite of what you want to "prove." The ten experiments were a set that had a low rate of success, compared to those performed earlier over a period of years at SRI. But even evaluating these ten, Prof. Utts stated: *"Using the standard applied to any other area of science, it is concluded that psychic functioning has been well established."*

Prof. Utts also stated: *"I am clueless as to why Ray Hyman is making claims in the media that we had access to the operational work for our review. I do not think he was given access to any information not shown to me."* Of course, all researchers on the panel should have been given access to the same information.

Perhaps the most interesting statement in the JSE about remote viewing was made by Russell Targ, one of the main SRI researchers: *"...it is my belief that the remote viewing data has made a significant contribution to our knowledge of our relationship to a non-local universe in which we are interconnected and increasingly interdependent. It is my hope that our awareness of this interconnectedness...will also promote greater compassion among all people."* It is a statement that could be taken several ways.

WJM

MOVIE REVIEW

by Todd Amundson

The Arrival

Charlie Sheen plays a radio astronomer searching for intelligent signals from space. As scientist, Zack Zabrinski, he is known for his creative ideas. When he decides to search the FM band, violating SETI protocols, he finds his message, but when he reports the exciting news to his boss, he loses his job under the guise of "company downsizing." No one will hire him so he takes matters into his own hands, borrowing neighborhood satellite TV dishes for his own program to verify the original signal, and somehow get the news in the hands of the public. He runs into some rather astounding problems in the form of aliens who are able to morph themselves into humanoids.

Overall , "The Arrival" is an action film with science fiction overtones, reminiscent of the paranoid thrillers of the cold war years. The creature design is very good, making the aliens both unusual and believable. The special effects enhance the story, rather than overpowering it. There is a silly subplot involving a climatologist studying global warming, but in total, this is an enjoyable film. See this one now, and compare it with "Independence Day" later this summer.

ADMIT
ADMIT
★ONE★

Moon Shots and Ghost Astronauts:

Did Deke Slayton Take His Last Flight After Dying?

by Loyd Auerbach and Martin Caidin

The following is reprinted from the Internet with the authors' permission. In checking out this amazing account, I spoke with Deke Slayton's wife, Bobbie Slayton, a Houston resident (and Houston Sky reader), to see whether she would deny the story. To my surprise, she confirmed almost all of it, saying that the FAA citation is still in her possession. — Houston Sky Editor

The late, great, world-famed astronaut Deke Slayton co-authored the book *Moon Shot*, adapted as a two-part special for Turner Broadcasting Systems (TBS) July 11 and 13, 1994. Slayton, during his life, was a crew member of the 1975 US-USSR Apollo-Soyuz mission, one of the original Mercury Seven astronauts, former test pilot with the USAF, and an avid racing plane pilot. He died at his home in Texas at 3:22 a.m., June 13, 1993. With him were his wife, Bobbie, and their daughter, Stacey.

But, as shown at the end of the second part of the TBS adaptation, that was not the last time Deke Slayton made his mark on this planet. Slayton's final flight took place hours after he died.

Later the same day he died (June 13, 1993), at 7:57 a.m. local time, at John Wayne Airport in southern California, a Formula One racing plane with large FAA required registration letters and numbers on the fuselage, N21X, took off from the airport and performed various flight maneuvers.

With a high-speed propeller, the extremely noisy aircraft was seen and heard by many people, who clearly identified the type of aircraft and wrote down the N21X registration. The Federal Aviation Administration determined that a noise level mandated by law had been exceeded, and issued a letter of citation against the registered owner and pilot.

On July 20, Bobbie Slayton received a letter in the mail dated June 28, 1993, from the FAA to Donald K. Slayton, notifying him that he was being cited for violating FAA regulations. The letter had been sent to a condo at which the Slaytons sometimes stayed, and its delivery was delayed until Mrs. Slayton picked up the mail.

Upon receipt of the letter, Bobbie Slayton telephoned the FAA and inquired if they had all gone crazy — pointing out that Deke Slayton had been dead for six hours before the reported incident in Orange County.

She further added that this particular racing plane, N21X, had been in an aircraft museum in Sparks, Nevada (located northeast of San Francisco), since March 1993 — and that before being placed in the museum, the engine had been removed from the aircraft and was still in the museum, next to the plane!

To save weight, the plane Slayton had flown had no electrical starter, and the engine could be started only by a person outside the plane who would swing the propeller while the pilot worked the controls inside. The plane sighted at the airport, however, had taken off on its own.

So *how could the plane have been there...* hours after Slayton died, when the plane, minus an engine, [was] in an aircraft museum?

Bobbie Slayton remarked that the reason for the delay Deke took before getting into the air in his racing plane was that *"he probably took six hours to find Gus" [Grissom, his best friend, who died in the Apollo I fire on Pad 34 at Cape Canaveral] "to prop the plane for him."*

Witnesses at the airport who were questioned first by the local authorities, and then by pilots talking to other pilots, and then by still more pilots and investigators sent to Santa Ana for further confirmation, all agreed that the airplane taking off the morning of June 13, 1993, was not only clearly identified as N21X, but that this particular airplane, which had flown for years with this federal registration, was an all-red Formula One racing aircraft, that it departed from the airport in Orange County, flew through various maneuvers in the area, and then flew off in a steady gradual climb on a westerly heading — and was never seen again. Martin Caidin, paranormal investigator, series advisor for *Moon Shot*, expert on aviation and manned and unmanned space shots, and author of the books *Ghosts of the Air* and *Natural or Supernatural?* has quoted Slayton as saying: *"No matter what happens, no matter how rough it gets, no matter how impossible it becomes — always keep the dream alive."*

According to Bobbie Slayton, the day after the incident, she phoned the Nevada museum to ask whether the plane was still there. The person with whom she spoke assured her that it was and had never been gone.

— Houston Sky Editor◆

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Your news or editorial contributions to this Newsletter are welcomed and appreciated.
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Tune in!

Give a listen to Bob Schultz , Net Control Operator for MUFONET. You can catch Bob on Saturday mornings, 7:00 CST, at 7.237 Mhz on the dial!
☺

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International Tesla Society
Meets the 3rd Saturday of each month,
1:00 to 5:00 PM • The Pavek Wireless Museum
3515 Raleigh Avenue • St. Louis Park, MN
Contacts: Jeff Rafferty 493-9060 Bob Bartholomew 420-4137

ICAAR's Great Plains UFO Conference
July 27, 28, Sioux Falls, SD – $98 Call 605-336-9000
Budd Hopkins, John Mack, Derrel Sims, Jack Kasher, John Foster, Chuck Brooks, John Anthony West, Stanley McDaniel, Christa Tilton, David Brewer

27th Annual MUFON Internat'l UFO Symposium
July 5 – 7 Greensboro, NC
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P.O.Box 5149, Greensboro, NC 27435-0149

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De Bestiis Marinis, or, The Beasts of the Sea (1751)

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But all sea animals have something, either in appearance or in habits, in common with land animals, on account of which even at first sight they are compared by the common people to these animals, and thus get their names. So the host of natural philosophers talk about bulls, horses, wolves, and, dreaming of allegories, bring in monks and other men. It has seemed to me worth mentioning that Ruthenian sailors when they first saw the manatee called it "*Korova Morskaia*," (Корова Морская) with exactly the same propriety as the English and Dutch called it a "sea-cow;" "*Sivutcha*" (Сивуча) they called "sea-lion," and "*Kot'*" (Кошъ) "sea-bear." Not noticing the criteria offered by nature, they less appropriately called the "sea-otter" "*Bobr Morskoi*" (Бобоъ морской). But all these animals became known only half a century ago; in fact, Marcgraf makes mention of the sea otter, but somewhat briefly and obscurely. The navigator Dampier, a tireless explorer, speaks of the sea lion and the sea bear; and many learned men, and Dampier as well, mention the manatee. But I must admit that the accounts given by the scholars are fragmentary and imperfect and for the most part fabulous and false. Dampier, on the other hand, has by many parasangs[1] excelled them with a most accurate description, as good as could be expected from an unlearned man.

But one must not suppose that these places do not contain more great and wonderful animals that are still unknown, besides those which I shall describe. For if weather, time, and place had favored my desire I should have enriched natural history with many curiosities of that sort, as indeed I desired when I took the risk of this journey to parts so distant and unexplored. Thus, for instance, I describe the traces of a certain unknown animal upon the island of Shumagin, and I insert a sketch of a sea ape, and with this imperfect account I must content myself and others.

---

[1] *parasang*: ancient Persian unit of distance, estimated at 3.5 miles.

In what order I shall next year examine the shores of the sea near the mouth of the river Kolima time will tell. My zeal is fired by those mammoth skeletons and the slight accounts of them. And I do not doubt that the American shores are to become better known to us, and with them this wonderful subject as well. As long as things escape us and perish unknown with our consent, and through our silence are counted as fabulous — things which may be seen with little labor in the very land where we, with all our inquisitiveness, live — it is not strange that these things, which we are prevented from observing by the great sea that lies between, have remained to the present time unknown and unexplored. In the farther confines of Asia and the Russian Empire I learned that the "*Suhac*'" of the Scythians was regarded as fabulous. I also learned that in the Desert of Azof, and in that where the Saporozkiensian Cossacks live, the one-horned goat bears the same name — an animal very common and very well known upon their tables. There is likewise a Scythian wolf, black in color, and described by Aristotle as longer than the common wolf but with shorter legs, exceedingly fierce and savage. There is also in the neighborhood of Voronesch and Astracan an animal that barks like a dog. It is sly and bloodthirsty and will attack people lying asleep or steal whatever it can from the household stores. This maybe the hyena of ancient times. And I desire nothing more than that, after I have explored Siberia, the authorities may think well to intrust to me the exploration of the deserts — provided no one else undertakes it; and I hope that if my efforts prove acceptable I may be sent into exile for several years on their account, that I may spend there a long time, which I prophesy will prove but too brief.

THE MANATEE

The following is a description of the manatee, or, as it is called by the Dutch, *Vacca marina* (sea cow), by the English, "sea cow," and by the Russians, "*Morskaia Korova;*" the description is made from a female killed on the 12th of July, 1742, on Bering Island, which lies in the channel between America and Asia. It had, according to the English scale of measurement, the following dimensions:

	Inches.	tenths
Length from the extremity of the upper lip to the extreme right *cornu* of the caudal fork	296	0
From the extremity of the upper lip to the nares	8	0
From the narial septum (*columna narium*) to the anterior angle of the eye	13	5
From the anterior angle to the posterior angle of the eye		8
Distance between the eyes at the anterior angles	17	4
Distance between the eyes at the posterior angles	22	2
The breadth of the narial septum (*columna narium*) at its base	1	5
Height of the nares	2	5
Breadth of the nares	2	5
From the extremity of the upper lip to the angle of the mouth (*oris froenum*)	15	5
From the extremity of the upper lip to the shoulder	52	0
From the extremity of the upper lip to the opening of the vulva	194	0
Length of the vulva	10	2
Length of the tail from the anal sphincter to the region of the caudal fin	75	5
Circumference of the head above the nostrils (*supra nares*)	31	0

	Inches.	tenths
Circumference of the head at the eyes	48	0
Circumference of the neck at the nape (*nucham*)	82	0
Height of the end of the snout	8	4
Circumference of the body at the shoulders	144	0
The greatest circumference about the middle of the abdomen	244	0
The circumference of the tail at the origin (*insertio*) of the fin	56	0
Distance between the extreme points of the caudal fin (this is the breadth of the fin)	78	0
Height of the fin	8	8
The whole length of the inner lip, which is villous and rough, like a brush	5	2
Width of the same	2	5
The width of the exterior upper lip, which stands obliquely to the lower jaw and is covered all over with rather long, white bristles	14	0
Height of the same	10	0
The breadth of the lower lip, which is hairless, black, smooth, and slopes toward the sternum, and is heart-shaped	7	4
Height of the same	6	8
From the lower lip to the sternum	54	0
The diameter of the mouth at the angle (*oris froenum*)	20	4
From the pharynx to the end of the oesophagus	32	0
The width, or rather length, of the stomach	44	0
The whole intestinal tract, from pharynx to anus	5,968	0
And so it is 20 ½ times as long as the whole animal.		
From pudenda to anal sphincter	8	0
Diameter of the trachea below the glottis	4	2
Height of the heart	22	0
Width of the heart	25	0
Length of the kidneys	32	0

	Inches	tenths
Width of the kidneys	18	0
Length of the tongue	12	0
Width of the tongue	2	5
Length of the nipples	4	0
Width of the humerus	14	5
Length of the ulna	12	2
Length of the skull from nares to occiput	27	0
Width of the occiput	10	5

Description of the External Parts

This animal belongs practically to the sea, and is not amphibious, although some authorities have so narrated; but they have misunderstood the stories of some others who tell of its feeding upon vegetation about the shores of the sea and rivers. But by this was meant not the vegetation of the land, but seaweed that grows out in the water on the shore of the sea. This seemed quite an unwelcome fact (that it fed on seaweed) and most absurd to Celsius Clusius, who had seen a whole hide stuffed with straw; but it is found to be so also in the case of the living beast (strange as it is true), if one will but have regard to its form, movements, and habits.

It is covered with a thick hide, more like unto the bark of an ancient oak than unto the skin of an animal; the manatee's hide is black, mangy, wrinkled, rough, hard, and tough; it is void of hairs, and almost impervious to an ax or to the point of a hook. It is an inch thick, and a transverse section of it is very like unto ebony both in smoothness and in color. This exterior cortex, however, is not skin (*cutis*), but cuticle (*cuticula*); but in the dorsal region it is smooth. From the nape to the caudal fin the surface is uneven with nothing but circular wrinkles, but the sides are exceedingly rough, especially about the head, and bristling

with many cup-shaped prominences like stemless mushrooms (*pezicas*). This cuticle which surrounds the whole body like a crust is frequently an inch in thickness; and it is composed of nothing but tubules, in the same way as we observe in the Spanish cane or *Mambu* of the Indians and Chinese (*ac in arundine videmus Hispanicove Mambu Indorum et Sinensium*). The structure of these tubules is perpendicular to the skin. Longitudinally they can not be torn or separated from one another. The tubules are implanted in the lower part of the skin; they are roundish, convex, bulbous, and hence pieces of the skin that are torn off from the cuticle are full of tubercles like Spanish bark, and the underlying cutis is excavated with a great many very small holes, like a thimble (*netricum digitale*), which were before the receptacles of the bulbous tubules of the cuticle. Now, these tubules rest upon one another very closely; they are tenacious, wet, and tumid, and they do not appear when the cuticle is cut horizontally, but the surface is smooth, as the hoofs of certain animals when they are cut. But as soon as it is hung up in pieces and exposed to the sun and becomes dry, it has perpendicular fissures and can be broken like bark, and then this tubulous structure comes clearly to view. Through these tubes a thin, serous mucus is exuded, in larger quantities on the sides and about the head, and in smaller quantities on the back. When the animal has lain for some hours upon the dry shore, the back becomes dry, but the head and sides are always wet.

Now, this thick cuticle seems given to the animal for two purposes principally: (1) That, inasmuch as the animal is compelled, for the sake of getting a living, to live continuously in rough and rugged places, and in the winter among the ice, it may not rub off the skin, or that it may not be beaten by the heavy waves and bruised with the stones, and when pursued it is protected by this coat of mail; (2) that the natural heat may not be dissipated in the summer by too profuse perspiration (*nimium transpirando*), or completely counteracted by the cold of winter. And that would be natural, for it has to live, not in the depths of the sea as other animals and fishes, but it is always compelled in feeding to expose half of its body to the cold.

I have observed in the case of many that were cast up dead upon the shore of the sea, that the cuticle had been broken off on one side or the other, and that that had been the cause of their death; and this happens principally in the winter time, from the ice.

And I observed many times in animals that had been captured and drawn on shore with a hook, that great pieces of cuticle had been pulled off in consequence of the violent thrashing of its body and tail and its resisting with its front feet, and that the broken piece of cuticle that covered the arms and caudal fin was like a hoof; all this goes to make my opinion stronger. Cuticle of exactly the same sort covers the whale (*balaena*), although no mention is made of it by the authorities; and almost the whole of the cuticle was rubbed off from a whale that was washed up dead upon our island on the 1st day of August, for during several days it had been tossed about by the waves, this way and that, and bruised upon the rocks before it came to our shore.

While this cuticle is wet it is tawny black, like the skin of a smoked ham, but when it is dry it is wholly black. In certain animals it is marked with rather large white spots and zones, and this color penetrates clear to the cutis. This cuticle about the head, eyes, ears, breasts, and under the arms, where it is rough, is thickly infested by insects, and it frequently happens that they perforate the cuticle and wound even the cutis itself. When this happens, large, thick, warty prominences arise from the lymph of the cutis, or from the broken glands that preserve the oil, as it were, in the little cells, in the same manner as in whales, and oftentimes make the above-mentioned places foul.

Under the cuticle lies the cutis surrounding the whole body. This is 2 lines thick, soft, white, very firm in strength and structure just like that of the whale, and it can be put to the same uses.

In comparison with the huge mass of the rest of its body the head is small, short, and closely connected with the body; in figure it is a square oblong, widening from the top toward the lower jaw. The top itself is flat and covered with a black cuticle, exceedingly scraggly and a third part thinner than the rest of the cuticle and more easily torn off. The head slopes from the occiput to the nares and slopes again from the nares to the lips. The end of the snout is 8 inches high and grows rapidly thicker from the nose to the occiput.

The opening of the mouth (*rictus oris*) is not underneath (*supinus*), but in a line with the sides; but the exterior upper lip is so large, broad, and oblique to the angle of the mouth, and lengthened out so much above the inferior mandible, that to one who looks at the head alone the opening seems to be located underneath.

The opening of the month itself is not very large in proportion to the animal, nor is it necessary that it should be, as it lives on seaweed.

The lips, both the upper and the lower, are double and divided into external and internal lips.

The external upper lip, finishing the end of the snout obliquely, is like a half circle; it is flat, tumid, thick, 14 inches broad, 10 inches high, in color a glossy white, and overgrown with a great many little hills or tubercles, from the center of each one of which grows a white, translucent bristle 4 or 5 inches long.

The internal upper lip is 5 inches long and 2½ inches wide. It is everywhere detached from the external lip, and fastened to it only at the base; it overhangs the palate, and it looks like a calf's tongue, all villous and rough like a brush. It closes the mouth firmly above; it is movable, and by its own motion serves to tear off the seaweed and bring it into its mouth; for it feeds in the same way as horses and cattle, by protruding its lips and bending them outward.

The lower lip is likewise double; the external lip is black, and smooth, and without bristles; it is roughly heart-shaped and like a chin, if we may so call it; it is 7 inches wide and 6.8 inches high.

The internal lower lip is separated likewise from the external; it is villous and is not visible when the mouth is closed, because the external lip reaches out and covers it; and being set opposite the internal upper lip it closes the mouth firmly.

When the lower mandible is applied to the upper, the space which intervenes when both are closed is filled up with a dense array of very thick white bristles 1⅛ inches long. These bristles prevent anything from falling out of the mouth while the animal masticates, or from being washed out with water which flows into the mouth and is driven out again through the opening when the mouth is closed.

The bristles are as thick as a dove's quill; they are white, hollow inside, bulbous below, and, even without the aid of a microscope, they show clearly the structure of the human hair.

If the animal lies prone upon its belly, the end of its snout on a line perpendicular from the nares to the lips is 8 inches high and is rounded in front, like a ball, from the nose to the ends of the lips and also to the lateral regions of the upper jaw. It grows thicker and increases rapidly in circumference. The external lips are very prominent, thick and swollen, and perforated with a great many large pores, like a cat's, from each one of which grows a strong white bristle; these bristles are perceptibly stouter the nearer they are to the opening of the mouth itself. Of the bristles those were especially noticeable for thickness which grow between the lips of either jaw. They take the place of teeth in pulling off the seaweed and prevent anything from falling out of the mouth while the animal masticates. The inferior maxilla is shorter than the superior; it alone is movable, but the lips of both maxillae move, as do the lips of cattle. With these the submarine plants which they tear off from the rocks with their arms are so cut off from the hard, uneatable roots and stems that they seem to be cut off with the edge of a dull knife. When the tide comes in these roots and stems are washed ashore, and lying there in great heaps on the seashore they betray to the visitor the present quarters of these guests, inasmuch as the stems of sea plants are tougher and thicker than those of land plants, the lips are made much stronger and harder than are the lips of any of the land animals; therefore the lips are also inedible, and can not be softened by boiling or in any other way. The internal structure of the lips is so arranged that when cut they are like a checkerboard, consisting of very small squares; there are countless very small, thick, red, rhomboid or trapezoid squares, with which others that are white, tendinous, full of cells like network and containing liquid oil, are interspersed in equal numbers. These lips when boiled in water very easily yield a great amount of oil, and when this oil is tried out the white cells appear like so much tendinous network. The purpose of this structure seems to me to be a threefold one: (1) That the strength and density of the lips may be increased, and that they may not be so easily exposed to any danger from without; (2) that the heavy lips may be more easily raised and moved, inasmuch as the origin and insertion of the muscles (*caput et caudae horum musculorum*) are so disposed that the origin of the muscles is set obliquely to the opening of the mouth, and the insertion of the muscles obliquely to the top of the head; so that with their beginnings and ends the lips make, as it were, a wreath of muscles; (3) that by means of this structure the lips may be moved with a sort of spiral motion, and that, since the head on account of the continuous thick crust can be moved only with difficulty, it may not be necessary for them to move the whole body as often as they wish to pull off the tenacious seaweed.

They masticate differently from all other animals; not with teeth, which they lack altogether, but with two strong white bones, or solid tooth masses, one of which is set in the palate and the other is fastened in the inferior maxilla, and corresponds to the first.

The insertion itself, or connection, is entirely anomalous, and would be expressed by no known name; *gomphosis* we can not call it, because the bones are not fastened in the maxillae, but each is held by many papillae and pores, pores and papillae alternating, in the palate and in the inferior mandible. Besides, in front it is inserted into the papillary membrane of the internal upper lip, and at the sides in the grooved edge of the bone, and at the back, with a double process, into the palate and inferior maxilla, and is in this way made firm.

These molar bones are perforated below with many little holes, like a thimble (*netricum digitale*), or like a sponge, in which the arteries and nerves are inserted in the same way as in the teeth of other animals. Above they are smooth and excavated with many winding, wavy canals, and between them are eminences which in mastication fit into the canals of the corresponding bone so perfectly that the seaweed (*fuci*) is ground and mashed between them as between a fuller's beams or between millstones. I have had a drawing made of these bones, which will explain more clearly what is less intelligible from the description.[1]

The nose is situated in the farthest tip of the head, as in the horse; there are two nostrils, and a thick cartilaginous column 1½ inches wide between them. The nostrils themselves are 2 inches long and just as wide in diameter. They are flat, and stretch back with many curves or labyrinths. Inside, the nostrils

are very wide, wrinkled, and covered over with a nervous membrane, which is perforated with many black pores. From each pore grows a bristle as thick as cobbler's waxed-end, a half inch long; they are easy to pull out, and they take the place of *vibrissae* in other animals.

The eyes are situated exactly half way between the end of the snout and the ears in a line parallel with the top of the nostrils, or just a very little higher. They are very small in proportion to so huge a body, being no larger than a sheep's eyes. They are not provided with shutters, or lids, or any other external apparatus, but protrude from the skin through a round opening, scarcely a half inch in diameter. The iris of the eye is black, the ball livid; the canthi of the eye are not seen except when the skin is cut away around the opening of the eye. At the inner canthus of the eye there is a cartilaginous crest (precisely like that of the sea otter), which, when necessity arises, covers over the whole eye and takes the place of a nictitating membrane adapted to warding off and removing any injury that might chance to fall while the animal feeds. This cartilaginous crest in the back part constitutes one wall of the lachrymal sac, with which it is joined by a common nervous membrane. When the lachrymal sac is cut a great amount of sticky mucus is found in its cavity. The sac itself would easily hold a chestnut, and inside it is enveloped in a glandular membrane.

The ears outside open only with a small hole, like the seal's. There is not the slightest trace of an external ear, and the holes can be seen only by examining very closely; for the opening of the ears can not be distinguished from the rest of the pores, and would scarcely admit the quill of a chicken's feather. The internal canal of the ears is smooth and covered with a highly polished black skin, and when the muscles of the occiput are separated from it, as they may easily be, it betrays itself by its own color and can be seen.

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[1] Tab. XIV, online at http://dz-srv1.sub.uni-goettingen.de/sub/digbib/loader?ht=VIEW&did=D151404

The tongue is 12 inches long and 2½ inches wide; and is like that of an ox. It is pointed at the end and the surface is rough with short papillae like a file. It is so deeply hidden away in the fauces that to many the animal has seemed to be without a tongue; for drawn as far forward as it may be by the hand, it still can not be made to reach the *froenum*, but will fall short of it by 1½ inches. If it were longer, as in other animals, it would be in the way in mastication.

The head, like the neck, is ill defined, and joins the body in such a way that a line of distinction is nowhere visible, as is the case with all fishes; but what obscurely suggests a neck is shorter by one-half than the head itself, and is cylindrical and more slender than the occiput in circumference. Notwithstanding, it is not only constructed with movable vertebrae, but has its independent action, a motion observed in the living animal only when it feeds; for it bends its head in the same way as cattle on dry land, but the thick and shapeless cuticle makes the quiet or dead animal look as though it were provided with an immovable neck, for no trace of vertebrae is to be seen at all.

From the shoulders toward the umbilical region it grows rapidly wider, and from there on to the anus it again grows rapidly slender; the sides are roundish and paunched like a belly which is swollen with a great mass of intestines, and elastic and puffed up like an inflated skin, and diminishes in size from the umbilical region toward the anus, and again from the mammae toward the neck.

When the animals are fat, as they are in spring and summer, the back is slightly convex; but in winter, when they are thin, the back is flat and excavated at the spine with a hollow on either side, and at such times all the vertebrae with their spinous processes can be seen.

The ribs rise on both sides in an arch to the back, and where they are joined to the vertebrae of the back by *amphiarthrosis*, as they are in a man, they extend downward like a bow, and in the

place where they are joined on both sides to the vertebrae they make a double hollow on the back.

At the twenty-sixth vertebra the tail begins, and continues with thirty-five vertebrae. The tail grows perceptibly thinner toward the fin. It is not so much flat as rather somewhat quadrangular, for all the vertebrae of the tail have two epiphyses [zygapophyses] and four processes. Of these the lateral processes are broad, flat, and blunt at the point. The spinous process on the dorsal side or spine (*processus superior in dorso seu spina*) is sharpened; the lower one is a broad, flat bone, like unto a Greek lambda. This is joined by a cord to the main body of the tail and is fastened to it with very strong ligaments and tendons. As a result of this quadruple position the muscles of the tail fill these cavities of the vertebrae and the angles between the processes, and so the tail itself gets the form of a square oblong with obtuse angles.

For the rest the tail is thick, very powerful, and ends in a very hard, stiff, black fin, which is not divided into rays, but solid, and is in substance like prepared whale-bone, and consists of nothing but layers, one upon the other, as if one solid piece. This fin is frayed out for a distance of 9 inches from the extremity, and is something like the fins of fishes that are spined with a ruder sort of spines. The fin itself that ends the tail is 78 inches wide or long, 7.3 inches high, and 1.5 inches thick, and is inserted in the muscles of the tail as if by *gomphosis*, or a triangular canal.[1]

The fin of the tail is somewhat forked, and both cornua, differently from the tail fins of larger sea fishes, as the shark and the like, are of the same magnitude. In this respect it agrees with the whale. And so the caudal fin is parallel with the sides, as is the case of the phocaena and balaena, and not with the back, as is the case with most fishes. With a gentle sidewise motion of its tail it swims gently forward; with an up-and-down motion of the tail it drives itself violently forward and struggles to escape from the hands of enemies who are trying to draw it in.

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[1] There is an evident omission here, as these measurements would give the animal an absurdly narrow tail, whereas we know from the references to the power of the animal, as well as from the figures that have been preserved, that the flukes were broad and powerful. The vertebræ and their muscles lie in the fibrous mass of the flukes as if driven in. — ED. [1899 note]

The strangest feature of all, in which this animal differs from all other animals both of land and sea and from amphibia, is its arms, or, if you please, its front feet; for two arms, 26.5 inches long, consisting of two articulations, are joined immediately to the shoulders at the neck. The end of the humerus is joined to the scapula by *arthrodia.*

The ulna and radius are like a man's; the ulna and radius terminate bluntly with tarsus and metatarsus. There are no traces of fingers, nor are there any of nails or hoofs; but the tarsus and metatarsus are covered with solid fat, many tendons and ligaments, cutis and cuticle, as an amputated human limb is covered with skin. But both the cutis, and especially the cuticle, are much thicker, harder, and drier there, and so the ends of the arms are something like claws, or rather like a horse's hoof; but a horse's hoof is sharper and more pointed, and so better suited to digging. On the back (*supine*) these claws are smooth and convex, but underneath they are flat and hollowed out in a way, and rough with countless very closely set bristles, half an inch long and hard like a brush.

I have seen in one animal these claws divided into two parts, like an ox's hoof. The division, however, was no more than marked, and that only in the cuticle; this happened more by mere chance than by the will of nature, and was the more easy and the more possible as the cuticle that covered the claws was disposed on account of its dryness to crack.

Now, this Platonic man, as the eminent John Ray was pleased in jest to call him, performs with these arms various offices: with these he swims, as with branchial fins; with these he walks on the shallows of the shore, as with feet; with these he braces and supports himself on the slippery rocks; with these he digs out and tears off the algae and seagrasses from the rocks, as a horse would do with its front feet; with these he fights, and when taken with a hook and dragged from the water upon dry land he resists so vehemently that the cuticle surrounding these arms is often torn and pulled off in pieces; and finally with these the female when smitten with the sting of passion, swimming prone upon her back, embraces her covering lover and holds him and permits herself in turn to be embraced.

The two breasts are different from those of most other animals, but in place and form are exactly as in man; they are situated one under each arm; and one breast is a foot and a half in diameter, convex, rough with many spiral wrinkles, full of glands, very hard — harder than a cow's — and without any intermingling fat. But the adipose tissue that surrounds the whole body rests upon them only with the same thickness as everywhere else, but the cuticle is thinner there and softer, and more wrinkled, and the papillae are likewise surrounded with a black cuticle with circular wrinkles, but soft. Under the arm itself, or axilla, the breast hangs, and when the animal is in milk the nipple is 4 inches long and 1½ inches in diameter; in those, however, which have gone dry, or have not yet given birth, it is so short and contracted that it seems nothing more than a chance wart, for the breast is not swollen.

The milk is very rich and sweet, and in consistency is very much like sheep's milk, and very often it was my wont to get the milk in large quantities from dead ones in the same way as from cows. The nipple is very much wrinkled and a little higher than the rest of the breast. When the glands are cut they give out milk which is like that which I collected by squeezing the papillae. Ten or twelve lacteal ducts open into each papilla. The breasts when boiled are a little harder than beef, and give out the odor of game, but mild.

They come together after the human fashion, the male above and the female below. The penis of the male is 32 inches long, and with its sheath is bound firmly in front to the abdomen, and reaches clear to the navel — in a word, it is very coarse and obscene to look upon, very much like that of a horse, and ends with the same sort of a gland, only larger.

The female pudenda lie 8 inches above the anus. The opening of the vulva is almost a triangle, and wider above, where the clitoris lies, and narrower toward the anus. The opening itself would without difficulty admit five fingers together. The clitoris is about 1½ inches long. It is cartilaginous and surrounded with a very strong, smooth skin, and is uneven, with many short wrinkles that fold together. The skin is variegated with yellow and white, and so is the vulva. The labia vulvae are very rigid and hard. The urethra empties into the vulva about 5 inches from the opening of the vulva. Below this is stretched a strong, crescent-shaped membrane, partly muscular and partly tendinous, which separates the vulva from the *vagina uteri*, properly so called, with a sort of vestibule, and makes a kind of hymen. But the aperture between the cornua of this membrane is so large that the penis of the male can without any difficulty enter the vagina. The vagina itself is 9½ inches long and covered with a very strong, fibrous membrane, which is ribbed longitudinally and hollowed out upon its surface with many furrows; between these furrows are seen a great many glands not larger than a pin's head, which secrete the mucus with which the vagina is covered all over. Next appears the uterus itself, spherical in shape, in size as large as the head of a cat. When I cut it open it was covered with mucus in the same way as the vagina, and wrinkled with a great number of folds half an inch wide. The substance of the vagina was so hard that I could

scarcely cut it with a knife. The ligaments of the uterus and of the fallopian tubes had precisely the same structure as those of a horse.

The anus is situated 8½ inches below the pudenda. It is closed by a sphincter that is not very tightly contracted. In diameter it is 4 inches wide. The sphincter is white; the inside coating of the rectal intestine is smooth, slippery, olive-gray, just as in horses, where it is sometimes black, sometimes white spotted.

Description of the Internal Parts

I opened the heads of four animals, and with the greatest painstaking I searched for the stones, incorrectly so called, of the manatee. But so far was I from being able to find anything in the least like a stone or bone that from this I decided that either those bones were not found in all of them, or were, found only in certain climates, or, what seemed more probable, that Schröder and others who describe these bones as having the form of a ball, had, like too superficial and untrustworthy compilers, given it this round form after the analogy of the bezoar stone, and that they had never with their eyes seen stones or bones of the manatee as they described; and so we should rather understand that they meant the masticatory bones, or those white tooth masses to be found in the palate and inferior maxilla; and this was the more likely, as the description given by the eminent Samuel von Dale in his Pharmacologia coincides with my own; and his description also corresponds to these masticatory bones. For he gives, perhaps from autopsy (*εκ αυτοψια*), because he did not understand the mechanism of these bones, the following description: "The stone of the manatee is a white crustaceous bone similar to ivory, taken from the head, and it is of various forms," by which he no doubt meant to indicate the openings and meanderings of various forms to be seen upon the surface of both bones.[1]

The cranium is very solid; it has but little cerebrum, and the cerebrum is not separated from the cerebellum by any bony plate. Of the rest I could observe nothing striking.

The oesophagus or gullet is very capacious. Inside it is surrounded with a very tough, white, fibrous membrane, and with many perpendicular wrinkles and folds it goes to the stomach, and there, before it ends, it concludes with a large number of little triangular appendices one line long, which turn back upward toward the oesophagus. The use of these is, I think, that they may hinder the reflux of the food back into the gullet, and at first sight they refute the preposterous opinion that has been held in regard to the animal's being a ruminant.

The oesophagus is inserted into the stomach nearly at the middle, as in the horse and the hare.

The stomach is of stupendous size, 6 feet long, 5 feet wide, and so stuffed with food and seaweed that four strong men with a rope attached to it could with great effort scarcely move it from its place and drag it out.

The coats of the stomach could not by any means be separated; together they were 3 lines thick. A very strange fat omentum 2 lines thick surrounds the stomach. In the upper part it adheres firmly at the middle to the membranous coat of the stomach; for the rest, it is detached and seems more to warm the stomach with its own heat than to hold it in place. The inner coat of the stomach is white, smooth, and not wrinkled nor villous. But what was most peculiar, and perhaps incredible to many, is that I found contained in the stomach, and not far from the entrance of the oesophagus into the stomach, an oval gland

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[1] These bones are undoubtedly the ear bones, and that Steller failed to find them is due to the fact that he looked for them *inside* the cranial cavity. The ear bones of Rytina are not unlike those of the existing Manatee. — ED. [1899 note]

as large as a man's head, and grown fast to it something like a large aneurism between the muscular and fibrous (*nervosa*) coat; this gland opened through the villous coat with many pores and openings and exuded into the cavity of the stomach a great quantity of whitish liquid, in consistency and color like pancreatic juice. I had as a witness of this curious phenomenon the assistant surgeon, Bettge. What the character of this juice was I discovered by a double chance experiment; when I inserted a silver tube through the pores of the inner coat, in order to discover by blowing into them the excretory ducts, the tube came out black, as is wont to happen when silver touches sulphurous acid. I observed the same thing when I ordered Archippus Konovalow, the helper of the assistant surgeon, to take out the contents of the stomach with his hands, and when this was done a silver ring that he had upon his finger was stained with the same color.

The inner coat of the stomach was perforated by white worms half a foot long, with which the whole stomach, pylorus and duodenum, swarmed; and the worms had penetrated clear into the cavity of the glands. The gland when cut poured out a great quantity of juice. After that I could not examine any more stomachs, because I lacked the necessary assistance; and with the few men I had I could not, if I found an animal lying anywhere, turn it over upon its back; and therefore I am in doubt whether this gland is a constant thing or rather the result of some disease.

The pylorus was so large and tumid that at first sight I took it for a second stomach and was anxious to find the two others, too, because I thought the animal was a ruminant. But when I cut into the pylorus I was otherwise informed, and from its being like the stomach I saw that it was the pylorus. But to my misfortune it happened that the pancreas along with the duct into the duodenum and the ductus choledochus were cut, for the simple reason that the stomach could not be taken out whole with the liver on account of its great size, and besides, my assistants, who had been hired for just one hour with tobacco, which took the place of money, became tired of the work. Yet I recognized that the pancreas was divided into two lobes and composed of many flat, rather large glands, and that it was, for so large an animal, comparatively small; for it did not extend in length beyond 4 inches.

There are more intestines in this animal than in any other, except, perhaps, the whale alone, which hitherto I have not been in a position to inspect. The abdominal cavity was so full that the abdomen was tumid and swollen like an inflated skin. Hence, when the common coverings and muscles of the abdomen were removed and the peritoneum received ever so slight a wound, the wind came out with such a whistle and hum as it is wont to come from an aeolipile. For the same reason the whole abdomen is covered with a very strong double, membranous, fibrous peritoneum for holding in the intestines. The peritoneum reaches from the os pubis to the sternum, and is attached on both sides to the false ribs, from each one of which strong tendons, spreading out in many rectilinear branches, run from both sides to the linea alba; and when the muscles of the abdomen on the surface of the peritoneum are removed the tendons meeting each other and crossing each other make the surface of the peritoneum tessellated like a checkerboard, and present a pleasing spectacle to the eye. Other like tendons grow from the inner side of the ribs and are seen to intertwine (*impexi*) tightly with the peritoneum on the inside, increasing its firmness as with horizontal processes. Both membranes run into a single one in the middle about the linea alba, but toward the sides they are double.

When the peritoneum is cut the intestines gush out violently, and without any outside assistance they move from their original place, because they are found always so tightly stuffed that from oesophagus to anus they make a solid pack without any open space. The thin intestines are smooth, rolled up in a great amount of fat; they are round and 6 inches broad in diameter. If only a very slight aperture should be made with the point of a knife, the liquid excrement (a ridiculous thing to behold) would squirt out violently like blood from a ruptured vein; and not infrequently the face of the spectator would be drenched by this springing fountain whenever some one opened a canal upon his neighbor opposite, for a joke.

The coecum was very large, as was also the colon, and by a ligament that extended lengthwise on either side was divided into many little cells. But the valve of the colon I could not find, search as I might. To be brief, the intestines were different from a horse's in size and capacity alone, but not in structure. And so the final product of this workshop is so like the excrement of horses, in shape, size, smell, and color, and all other attributes, that it would deceive the most expert stable boy. And I will not deny that on the first days after our arrival on the island I was ignominiously deceived; I considered it no slight marvel, but I did not make the boast to have found what the boys did in the beans (*faba; fabula (?)*),when I found the stuff frozen together and so inexplicable (*cimmelium*). Now, I, not knowing from whence it came, argued from utterly false premises to an absolutely true conclusion that America lay opposite this island and not far away (for up to that time the continent had not been seen on account of the autumnal fog). But since horses are not kept in Kamchatka, but are kept in parts of America, the fact that the dung was brought over there whole and not dissolved, was an unquestionable proof of the proximity of land.

The whole intestinal tract, from gullet to anus, when this Augean stable was thoroughly cleansed, measured fully 5,968 inches, and so the intestines are twenty and a half times as long as the whole living animal.

The mesentery is exceedingly thick and half covered with a mass of little glands, varying in size from that of the acorn to that of the walnut. The lacteal, as well as the lymphatic vessels, I could not observe because of the opacity of the very fat, thick mesentery, although I searched while the intestines were still warm, for the veins are only obscurely and darkly transparent, inasmuch as they are as thick as one's finger.

A very strong, double membrane constitutes the pleura. Inside this, one continuous muscle an inch thick is interposed and covers both sides.

The urinary bladder, 2 lines thick, was very strong, but not larger than a man's head, and smaller than the bladder of an ox.

The trachea is composed of long, cartilaginous circles or semicircles, but has an entirely anomalous structure. One continuous piece of cartilage is twisted into a spiral and covered with a strong continuous membrane, both inside and outside. But the spirals of the trachea are not everywhere equal in breadth, but in some places the edge of the upper circle is hollowed out to receive the opposite eminence of the lower circle, and so makes it crooked. And so, by the help of this double membrane that encircles the trachea, the spirals are kept from being dislocated, either inside or outside. Through this mutual intertwining the rings are prevented from being loosened laterally. By this spiral structure the trachea is separated into branches below the glottis and reaches to the bronchi, and is seen to be such in the very substance of the lungs; it is so constructed for no other reason, perhaps, than that by the continuity of these spirals the huge mass of lungs may be more easily lifted up in breathing; for neither muscles nor anything else give so much help to the motion of lungs, which are situated in the back.

The glottis is like that of an ox, but is closed by the epiglottis much more closely and firmly than is the case in the land quadrupeds, so the epiglottis is in proportion much thicker. The diameter of the trachea below the glottis is 4.2 inches.

The thyroid gland is very large, and when cut it poured out a large quantity of liquid of double consistency and color: that which came from the larger exterior glands when cut was of the color of milk, but thicker than sheep's milk, and sweet to the taste; that which came from the middle portion of the gland or receptacle for the gland was contained in a membranous sac of its own; it was glutinous and had the consistency of meal poultice; it was somewhat sweet, with a very slight taste of bitter, and was yellowish-white in color. It occurred to me only in the last animal that I opened to make a closer inspection of this gland. I am very sorry that I did not think of it sooner, and take the pains to have the trachea, with the gullet, heart, and the rest of the viscera taken out entire. But it was not possible without the help of many men to do so with an animal so huge. If I had been in a position to do that, I should have observed whether or not it unloaded this liquid through some tube into a duct of its own, or into the stomach, as Vercellonius thought, or somewhere else. I saw the duct only after it was cut, but whither it led I neither saw nor do I wish to conjecture.

As to the heart it differs in many respects from the heart of all other animals: (1) In regard to situation, the apex of the heart stands in a line oblique to the sternum, the base in a line oblique to the back. (2) As to connection, the heart does not rest against the mediastinum, but is detached on every side and has no mediastinum at all. (3) It has a pericardium (but this does not envelope the heart closely) and a sac; but it forms rather a species of cavity in the thorax and lines the thorax. Toward the back and the base of the heart the pericardium is nearer to the heart than it is anywhere else. When the animal is feeding, the heart itself, with the pericardium, hangs not quite perpendicularly but somewhat obliquely from back to sternum; and so there the pericardium takes the place of a mediastinum. Lower down toward the abdomen the pericardium is fastened to the inner wall of the diaphragm, and with it constitutes one wall;

and so it rests against the pleura at the sides. (4) As to size, when placed in a scale it weighed 34¾ pounds, and was from base to apices 2 feet 2 inches long, and from the extremity of one auricle to the other 2⅛ feet broad; and so it was broader than it was long. (5) As to form, it was broad and thick, rather than long, and what was the greatest peculiarity of all it ended, not like a top in one apex but, in accordance with the number of ventricles, in two apices. Now, this slit in the apex extends to one-third the length of the heart, and from there on the two apices coalesce in one and form the septum of the heart, dividing the ventricles. The left apex is just a little longer than the right and thicker in circumference. The ventricles of the heart are extended farther below the septum, each into its own apex. The chordae tendineae and the columnae carniae (*cordis trabes*) or *sulci* (furrows) exceed the equipment of the human heart, not only in size and strength but also in number. The valves are the same in the pulmonary vein, the vena cava, the aorta, and the pulmonary artery, as in a man. The base of the heart is surrounded with a great quantity of thick fat that is placed around it like packing, distributed everywhere to the thickness of half an inch. Below this the large coronary veins of the heart are seen, covered inside with little valves which I have never observed anywhere else before in any other animal. With great care I searched for the foramen ovale and for the ductus arteriosus Botalli, but in vain. When I cut through the cavity of the pericardium I found it half full of liquid, so that even by this quantity alone I was led to believe that this liquid was unnatural (*praeter naturalem*), and that at the end it had been collected into this cavity, from whatsoever source it may have been secreted, in consequence of the slow and distressing death of the animal.

The lungs are two very long, white lobes that extend to the middle of the abdomen, one on either side along the dorsal spine. They are, however, detached, and not fastened anywhere,

in which respect they differ from the lungs of birds, although they agree with them in respect to their position in the back. Either lobe is covered outside with a very strong membrane, and so if one should think only of the external structure and color of the lungs one would scarcely consider them to be lungs at all.

The liver consists of two very large lobes and a third of quite peculiar form; the third is almost square and looks like a blacksmith's anvil. It is situated half way between the two larger lobes, and is raised above them and lies immediately under the sternum. Outside, the liver is covered with a very strong fibrous membrane, so that it suggests anything but a liver. Through this membrane, in the gibbous part, the branches of the coeliac vessels (*venae celiacae*) excessively tumid, shine through like a tree, blue in color. When this membrane was cut the substance of the liver appeared, in color a tawny yellow, like that of an ox, but externally soft and most delicate in structure, so that at the touch it dissolved as if putrid under my hand.

The animal has no gall bladder. But the ductus choledochus, like that of a horse, would easily admit five fingers together; and so it was very capacious; it was half a line thick and very strong, whitish outside and yellow inside, and, opening into the duodenum, it coalesces along with the pancreatic duct into one canal.

The kidneys are hidden away in a cavity of the lumbar region on either side of the dorsal spine. They are 32 inches long and 18 inches wide; they have the ordinary form of kidneys and are included in a very strong membrane; when this was removed there appeared a great number of renules of the same form, as in the seal and the sea otter, but in size they were much larger than these. They were 2 inches long and 1½ inches wide on the surface, and they were pyramidal in form toward the interior. Each one of these lobules (*renunculi*) is provided with an urethra, papillae, and artery of its own. The urethras form six larger principal branches, and at last carry down the urine through one canal to the urinary bladder. But the pelvis is like an elephant's.

I overlooked the suprarenal capsules (*capsulae atribilariae*), and also the spleen, and likewise the internal organs of generation, and many other things which occurred to me in order only when I had no longer time nor opportunity for making full observations.

Brief Description of the Bones

As to the bones of the manatee, the bones of the head in respect to strength and firmness are like those of a horse, but in respect to size and thickness they surpass the bones of all animals of the land.

The bones of the head taken together are not larger than a horse's head, nor are they very different in respect to form and articulation.

The cranium is anteriorly entire, without any suture, extending toward the nasal bones[1] in two hard processes, and joining the nasal and maxillary bones by an arthrodia, while the nasals join the maxillaries by ginglimus. The nasal bones meet in a rough suture. The temporal bone joins the cranium by suture, but the occipital by coalescence, being very hard and almost like rock. The inferior maxillary in adults consists of one bone, in calves of two.

The head from the nares to the occiput is 27 inches long, and at the occiput 13½ inches wide.[2]

There are sixty vertebrae in all: six in the neck, nineteen in the back, and thirty-five in the tail.

There are five pairs of true ribs and twelve of false.

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[1] Really the frontals. — Ed. [1899 note]

[2] Given in the previous table as 10½.— Ed. [1899 note]

The body of the vertebrae of the neck is narrow, in general structure like the vertebrae of the horse's neck. How much they differ in certain special features I will not indicate, as I have no books nor a horse's skeleton, nor should I trust my memory or imagination.

The spines of the dorsal vertebrae are sharp and broad, and in lean animals, as there is no thick cuticle or thick adipose tissue in the way, they are perfectly visible.

The vertebrae of the back in the region of the stomach and liver are ridged on the inside, but all the rest are rounded and lack this sharpened prominence.

The vertebrae of the tail have each four processes; the lateral processes are long and broad; the superior process is like the lateral process in width but is shorter; and the inferior processes (chevrons) are single bones like the Greek lambda in shape, and are fastened to the body of the vertebrae by a cord and held firmly with very strong ligaments. All the vertebrae are joined together longitudinally by a great number of very strong, broad tendons, and are everywhere so covered up that because of them the bones can not be seen.

The five pairs of true ribs are joined to the sternum with cartilage. Both the true and the false ribs are all solid and very heavy and thick.

The sternum in the upper portion where the ribs are fastened on is cartilaginous; in the lower portion toward the notch of the heart (*scrobiculum cordis*) it is bony to a distance of a foot and a half.

In place of the innominate bone of the hip there are two bones, one on each side in size and form like the ulna of the human skeleton, and joined with very strong ligaments to the thirty-fifth vertebra on one side and to the os pubis on the other. It has no clavicles.

The arms consist of two bones, tarsus and metatarsus.

Description of Its Habits and Nature

I should have abstained from an extended description of this animal if I had not observed that there are in existence some brief and imperfect histories of the manatee, swarming with fables and false theories after the manner of the last century and the century before, in which the writers of natural history saw only through a lattice what they might have seen with their eyes; when investigating the unknown habits of animals, their character, and a thousand other things that have nothing to do with their subject, they only involved the best known facts in more than Cimmerian darkness.

Therefore I have endeavored to give a clear and succinct idea of its external form and that of the structure of its internal parts by stating its agreement and disagreement with others, next by explaining the mechanism and nature of the animal, and after that the use of its parts for food, medicine, and other things, and finally to add in perfect truth what I observed with my own eyes in regard to the movements, nature, and habits of the living animal.

Various things combined to cause me many disappointments. The weather at the time when the animals were captured was almost constantly rainy and cold; my observations had to be made in the daytime; then there were the tides of the sea; and the droves of blue foxes (*isatides*) would spoil everything with their teeth and steal from under my very hands; they carried away my maps, book, and ink when I was studying the animal and worried me when I was writing; the great size of the animal itself and the bulk of its parts were also a hindrance, as I had to be both observer and workman, as all the rest were anxious about the construction of a ship and our liberation from the island. At my own expense I could hire them for barely an hour at evening time for some of the simpler assistance, and in their

ignorance and dislike for the work they would tear everything to pieces, and acted according to their own inclinations; so the injury they wrought and the loss they caused ought to be commended in that they did not desert me entirely. Not a single gut could I get out entire, nor unfold if I had got it out, so as to do anything worth while; so that for all the pleasure I got from certain observations I had twice as much trouble and annoyance in consequence of those useful things which I had to leave alone. So I beg of my kind readers, when they have finished reading this feeble description, that they will judge it by my will and my zeal rather than by the circumstances.

I had prepared a skeleton of a manatee calf, and I had taken the cutis with the cuticle separated from it and stuffed it with grass to bring it home with me; but when I saw that on account of the small size of our craft this was impossible I wanted to bring with me at least the spoils (skin), but even this wish was vain. I intended to do the same with the sea lion, the sea bear and the sea otter, but I was reckoning without my host, for in Kamchatka there is no hope of getting everything.

But let me cease from narrating my complaints and my hindrances. The manatee is not the sea cow of Aristotle, for it never comes upon dry land to feed. And it is of little consequence whether it is the same or not, for it is not this animal that he described; indeed, he never saw it and never heard anything about it to tell. In the second place, I remark that Lopez Francisco Hernandes themselves saw the animals, and that Clarissimns Clusius and Ray, misinformed by them, have affirmed many things of the animal that are inconsistent with truth and autopsy.

1. The animal has no hair at all that can properly be called hair. It has bristles rather, or hollow quills, and these are found only around the mouth and under the feet.

2. The head of this animal is not that of a calf, as Cl. Clusius says; not that of an ox, as Hernandes was pleased to describe it;

but in the character of its covering it is like no other animal, but has its own peculiar appearance.

3. The feet are entirely without claws, but skin covers them as it does the bone of an amputated limb, so that the animal moves upon a skin that is rough with bristles.

4. As to the fact that Hernandes attributes to this animal nails like those which men have, in order to make it more like the Platonic man, that is equally false, for the animal has no fingers at all any more than nails, unless perchance the hoof of a horse, to which it bears a certain resemblance, impresses anyone as being like a human nail.

5. And so, by the way, it is evident even from this how much obscurity envelops this subject if we start with false premises and arrive at worse conclusions. For instance, all authors with one consent agree that this animal ascends rivers and feeds upon the grass that it may manage to get along the banks, for they may perhaps have heard from the people that it feeds on herbs; but those are not land herbs, but seaweeds.

Nor does the statement have the appearance of truth, that they are in the habit of lying upon the rocks and of coming up on the land, even if I say nothing of the fact that the structure of the animal is totally unfitted for moving on dry land. Indeed, it happened that as the tide went out the waves receded from under one of the animals sound asleep and left him high and dry upon the shore; but he was helpless and unable to get away, a pitiable object, at the mercy of our cudgels and axes.

That this animal should be tamed seems more likely than do the anecdotes that are given of its remarkable sagacity, since even the untamable can be tamed through its stupidity and greediness. It happened to me on one unlucky occasion that I could watch the habits and ways of these beasts daily for ten months from the door of my hut, and I will briefly note down the observations that I made with great care.

These animals are fond of shallow sandy places along the seashore, but they like especially to live around the mouths of rivers and creeks, for they love fresh running water, and they always live in herds. They keep the young and the half-grown before them while they feed, but they are careful to surround them on the flank and rear and always to keep them in the middle of the herd. When the tide came in they came up so close to the shore that I often hunted them with my stick or lance, and sometimes even stroked their backs with my hand. If they were badly hurt, they did nothing but withdraw to a distance from the shore, and after a short time they would forget their injury and come back. Most commonly whole families live together in one community, the male with one grown female and their tender little offspring. They appear to me to be monogamous. The young are born at any time of year, but most frequently in autumn, as I judged from the new-born little ones that I saw about that time. From this fact, as I noticed that they copulated by preference in the early spring, I concluded that the foetus remained more than a year in the womb. From the shortness of the [uterine] cornua (*ex cornuum brevitate*), and from the fact that there are only two mammae, I infer that they have but one calf, and I have never seen more than one with the mother at a time.

These animals are very voracious and eat incessantly, and because they are so greedy they keep their heads always under water, without regard to life and safety. Hence a man in a boat, or swimming naked, can move among them without danger and select at ease the one of the herd he desires to strike — and accomplish it all while they are feeding. When they raise their noses above the water, as they do every four or five minutes, they blow out the air and a little water with a snort such as a horse makes in blowing his nose. As they feed they move first one foot and then the other, as cattle and sheep do when they graze, and thus with a gentle motion half swim and half walk.

Half of the body — the back and sides — projects above the water. While they feed, the gulls are wont to perch upon their backs and to feast upon the vermin that infest their skin, in the same way as crows do upon the lice of hogs and sheep. The manatees do not eat all seaweeds without distinction, but especially (1) *Crispum Brassicae Sabaudicae,* with cancellate leaf [sea-cabbage]; (2) that which has the shape of a club; (3) that which has the shape of an ancient Roman shield; (4) a very long seaweed with a wavy ruffle along the stalk. Where they have stopped, even for a day, great heaps of roots and stems are to be seen cast upon the shore by the waves. When their stomachs are full some of them go to sleep flat on their backs, and go out a distance from the shore that they may not be left on the dry sand when the tide goes out. In winter they are often suffocated by the ice that floats about the shore and are cast upon the beach dead. This also happens when they get caught among the rocks and are dashed by the waves violently upon them. In the winter the animals become so thin that, besides the bones of the spine, all the ribs show. In the spring they come together in the human fashion, and especially about evening in a smooth sea. But before they come together they practice many amorous preludes. The female swims gently to and fro in the water, the male following her. The female eludes him with many twists and turns until she herself, impatient of longer delay, as if tired and under compulsion, throws herself upon her back, when the male, rushing upon her, pays the tribute of his passion, and they rush into each other's embrace.

Their capture used to be effected with a large iron hook whose point resembled an anchor's fluke. The other end was secured by a very long, stout rope to an iron ring. A strong man took this hook and entered the boat with four or five others, and while one held the rudder three or four rowed gently toward the herd. The spearman stood in the prow of the boat holding the hook in his hand, and struck as soon as he was near enough.

As soon as this was done, thirty men standing on the shore with the other end of the rope in their hands held the animal, and in spite of its frantic efforts at resistance they dragged him laboriously toward the shore. The boat was held steady by another rope, and the men wore the animal out by constant blows, until, tired and rendered thoroughly passive by the spears, it was finished by their knives and other weapons and drawn to land. Great pieces were cut from the animal while still alive, but all that he did was to work his tail vigorously and to brace himself with his fore feet, so that great pieces of skin were often torn off. Besides, he breathed heavily, as with a groan, and the blood from the wounded back spurted up like a fountain. As long as he kept his head under water the blood did not flow out, but as soon as he raised his head to breathe the blood leaped forth anew. This happened because the lungs, being situated at the back, were wounded first, and as often as they were filled with air they increased the force of spurting blood. From this I have concluded that the circulation of the blood in this animal, as in the seal, is in a double fashion — in the open air, through the lungs, but under water, through the *foramen ovale* and *ductus arteriosus,* although I did not find both. But I think it happens that they breathe differently from fishes, so that they can better swallow solid food, rather than for the sake of promoting circulation (*propter deglutitionem solidorum potiusquam propter cir culationem promovendam*).

The full-grown, very large animals are more easily taken than the young ones, because the young move about far more vigorously, and even if a whole hook should be fixed in one of them it can get free by tearing the hook out of the skin. We saw this done more than once.

But if one animal is caught with the hook and begins to plunge about rather violently those near him in the herd are thrown into commotion as well and endeavor to assist him. To this end some of them try to upset the boat with their backs, others bear down upon the rope and try to break it, or endeavor to extract the hook from the back of their wounded companion with a blow from their tails, and several times they proved successful. It is a very curious evidence of their nature and of their conjugal affection that when a female was caught the male, after trying with all his strength, but in vain, to free his captured mate, would follow her quite to the shore, even though we struck him many blows, and that when she was dead he would sometimes come up to her as unexpectedly and as swiftly as an arrow. When we came the next day, early in the morning, to cut up the flesh and take it home, we found the male still waiting near his mate; and I saw this again on the third day when I came alone for the purpose of examining the entrails.

As to voice, the animal is dumb and utters no sound, but only breathes heavily and seems to sigh when wounded. I will not venture to assert how much their eyes and ears are worth. Anyway, they see and hear but little, because they keep their heads under water. At all events, the animal himself seems to neglect and despise the use of these organs.

Of all those who have written about the manatee, no one has given a fuller or more careful account than that most curious and painstaking explorer, Captain Dampier, in his travels, published in English in London in 1702. As I read it I could find no fault with it, although a few statements did not correspond with our animal.[1] For instance, he says that there are two species of manatees, in one of which the eyes are better than the ears, and in the other of which the ears are better than the eyes. What he says about the manner of hunting the animal, namely, that the Americans approach without any noise and without speaking, so as not to frighten the manatee, is no doubt true of places where they are caught in great numbers and have learned by long experience that men are dangerous to them. It was the same way with the otter, seal, and blue fox (*Isatis*), which lived in this desert island and never saw a man before and never were disturbed while lying at their ease. They were slain with no trouble at all when we first came to Bering Island, but now they have become just as wild as those living in Kamchatka, and take flight at once as they discover, not only with their eyes, but even with their sense of smell, the approach of an enemy.

It sometimes occurred that these animals were cast up dead by storms around the cape called Kronotskoi, as well as about Avatcha Bay. Because of the food they eat they are called by the inhabitants, in their language, "*Kapustnik*" (Kraut Esser; weed eaters); this I learned after my return in 1742.

Now, I must tell the uses to which the parts of this animal are put. The skins, which are very thick, firm, and tough, are used by the Americans, according to Hernandes, for the soles of shoes and for belts. I understand that the Tschuktschi use the skins for boats; that they stretch it with sticks and use it in the same way as the Koriaks use the skins of the largest sort of seals, called "*Lachtak*."

The fat underlies the cuticle and the skin and covers the whole body to the depth of a span, and in some parts is almost 9 inches thick. It is glandulous, stiff, and white, but when exposed to the sun it becomes yellow like May butter (*butyri maialis*). Its odor and flavor are so agreeable that it can not be compared with the fat of any other sea beast. Indeed, it is by far preferable to that of any other quadruped. Moreover, it can be kept a very long time, even in the hottest weather, without becoming rancid or strong. When tried out it is so sweet and fine flavored that we lost all desire for butter. In flavor it approximates nearly the oil of sweet almonds and can be used for the same purposes as butter. In a lamp it burns clear, without smoke or smell. And, indeed, its use in medicine is not to be despised, for it moves the bowels gently, producing no loss of appetite or nausea, even when drunk from a cup; and, in my opinion, it would do calculous persons more good than the masticatory bones or so-called stones (*lapides*) of the manatee. The fat of the tail is harder and stiffer and so more delicate when tried out. The flesh has a grain somewhat tougher and coarser than beef, and is redder than the flesh of land animals; and what is remarkable, even in the hottest days it can be kept in the open air for a very long time without any bad odor, even though all full of worms. I attribute this to the fact that the animal lives entirely upon seaweed and sea plants. These weeds contain a smaller proportion of sulphur and more sea salt and nitre. This salt prevents the loss of sulphur and the softening and decaying of the flesh, preserving it in the same way as salt or brine sprinkled upon meat; but they work even more powerfully, as these salts are more intimately mingled with the substance of the flesh and are combined more permanently with the sulphurous parts (or particles of sulphur?) (*cum sulphureis partibus fortius cohaereant*).

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[1] It is of course to be remembered that Dampier was speaking of the true manatees *Trichechus inunguis* and *T. latirostris.* [1899 note]

Although the flesh needs to be cooked longer, yet when done it has an excellent taste, not easy to distinguish from that of beef. The fat of the calves resembles fresh lard, so that you can hardly tell the difference; but their flesh is just like veal. When boiled it soon becomes tender, and if the boiling is continued it swells up like young pork so that it takes up twice as much space in the pot as it did before boiling; but the muscles of the abdomen, back, and, sides are far better. The flesh does not really refuse to be salted, as many have thought, but the salt only modifies it, so that it becomes quite like corned beef and very excellent in flavor.

The internal organs—heart, kidneys, and. liver—are very tough, and we did not try to do much with them, because we had a great abundance of meat without.

A full-grown animal weighs about 8,000 pounds, or 80 hundredweight, or 200 Russian "*pud.*" There is so large a number of

these animals about this one island that they would suffice to support all the inhabitants of Kamchatka.

The manatee is infested with a peculiar insect something like a louse, which is wont to occupy and inhabit in great numbers especially the wrinkled arms, the udder, the teats, the pudenda, the anus, and the rough hollows of the skin. When they bore through the cuticle and the cutis, here and there wart-like prominences are produced by the lymphatic moisture that exudes. So these insects attract the gulls to perch upon the backs of the animals and hunt this dainty with their sharp beaks, thus rendering the animals, which are worried by the vermin, a friendly and welcome service.

These insects are for the most part half an inch long, articulated, six-footed, translucent, white or yellowish. The head is oblong, sharp, larger than a millet seed. In front extend two short, jointed little antennae half a line long. In place of a lower mandible it has two slender, two jointed little arms like a shrimp, very sharp and pointed on the end. Furthermore, in accordance with the number of his feet, he is composed of six articulations, convex on the back, and one-third of a line wide. But the ring of the thorax is twice as wide, and they grow narrower toward the tail. The ring of the thorax resembles the half of a lentil. On the sides of this a pair of thick claws grows, with two joints each. Each claw ends in a flexible point, by means of which it holds fast to the skin of the manatee; the rest of the legs are rather slender, all ending in prickly points, and gradually shorter. The last two are the shortest, and, growing out from the orbicular ring of the tail, form the end of the body itself and steer the insect as it moves.

The Sea Bear[1]

The following is a description of the animal first seen and described by Dampier under the name "sea bear"; called by the Russians "Kot," *gentilibus ad Sinum Penschinicum Tarlatshega.* The description made on the 28th of May, 1742, on Bering Island. The largest weighing about 1820 Russian "pud" or 800 pounds.[2]

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Habits and Characteristics

Dampier has given us a description of this animal, called *Kot* by the Russians, which is, to be sure, brief and imperfect; but he mentions its characteristics so definitely and plainly and so clearly at first sight that I can not doubt that the animal is his "sea bear."

Report, as I gather from the account of the people, has declared that the sea bear, as it is called by the Rutheni and other people, is different. They say it is an amphibious sea beast very like the bear, but very fierce, both on land and in the water. They told, likewise, that in the year 1736 it had overturned a boat and torn two men to pieces; that they were very much alarmed when they heard the sound of its voice, which was like the growl of a bear, and that they fled from their chase of otter and seals on the sea and hastened back to land. They say that it is covered with white fur; that it lives near the Kuril Islands, and is more numerous toward Japan; that here it is seldom seen. I myself do not know how far to believe this report, for no one has ever seen one, either slain or cast up dead upon the shore.

This is certain, whether we consider the appearance of the body or the habits of the beast, it is more nearly related and more similar to no other land animal than to a bear.

They are never seen in the gulf of the Penshin Sea nor in the land of Kamchatka, nor do they go on shore in the Kuril Islands except very seldom; they are not taken except on three Kuril Islands, and from there to the mouth of the river of Kamchatka, in the so-called Bobrovi [sea otter] Sea, from latitude 50° to 56° N. These bears pass by the Kuril Islands in the early spring, and in September they are taken in small numbers about the mouth of the river called Shupanova and from there to Cape Kronotski in greater numbers. Here, to be sure, between the two capes, Kronotski and Shipunski, the sea is quieter and there are more inlets and recesses; hence the animals delay here longer as they pass by and more of them are caught. Almost all that are caught in the spring are females, and have the young almost ready for birth within them. The foetuses, when removed, are called "*Viporotki.*" All that are found are put on the market. They are no longer to be seen anywhere from the first of June to the end of August, when, with their young, they return to the south. For many years these migratory animals have been a source of wonder and speculalation to the people who have been interested in hunting them. For, whence did these animals come in early spring? Whither were these very fat, these pregnant beasts, going in countless droves? What are the reasons for this migration? Why do they return with their offspring in the fall so thin, dry, and weak? And whither are they going?

From the fact that the animals come very fat from the south in early spring and return thither in the fall, it was naturally inferred that they had taken no long journey, and that their winter quarters could not be very far distant, else they would become too thin upon the way. And from the fact that they were all going toward the east and were never seen beyond Cape Kronotski or the mouth of the Kamchatka River, either going east or returning home, they concluded that there must necessarily be some land, either island or mainland, near the land of Kamchatka and in a line with Cape Kronotski.

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[1] or fur seal.

[2] The Miller translation omits 15 pages of measurements and descriptions of the external and internal parts.

Among amphibious sea beasts these are the migratory animals, like geese, swans, and other sea birds, or like catanadromous trout among fishes; the blue foxes, hares, and mice occupy this place among quadrupeds. Now the migration of the blue fox is undertaken because food becomes scarce. Birds and fishes migrate to lay their eggs or to indulge undisturbed their sexual instincts, and, because their strength is reduced or their feathers shed, and hence they are unable to flee from their foes until these can grow once more, solitary places are chosen by birds and quiet lakes by fishes. Accordingly, for a similar reason, these northern places are chosen by the sea bears; and these desert islands, lying in great numbers between America and Asia from 50° to 56° north latitude, are chosen for the following reasons.

That the mothers may bear their young there upon the land and after parturition recruit their strength; further, that the young may there be brought up and nourished and may grow strong enough in three months to follow their parents home in the autumn. The pups are fed with their mother's milk for two months. The mothers have nipples corresponding in form, size, and position with those of the sea otter, and they are situated near the pudenda. They bear one pup at a birth, very seldom two. After parturition they gnaw the umbilical cord off from the pups with their teeth, as dogs do, and lick it till it is dry, so as to keep the blood soft until it heals; and they devour the afterbirth greedily. The pups are born with their eyes open, and their eyes

are as large as those of a calf. When they are born they have thirty-two teeth started out on a level with the gums; but there are four larger canine teeth, ferocious and suitable for battle, still hidden in the gums. These come out after the fourth day. When the pups are born they are covered with shining black fur all over. But the fourth or fifth day after birth the fur under the front legs changes color perceptibly and takes on the color of the hair of Pliny's goat; and after a month the belly and sides become speckled with an intermixture of hairs of the same color. At birth the males are much larger and darker, and in the years that follow they get a blacker coat than the females. These latter become almost wholly ashy gray, but have rusty spots under the forelegs. The females differ so much from the males in size, weight, and strength, that a careless observer might almost take them for a different species, so timid and so little ferocious are they.

The parents love their young exceedingly. The females, after parturition, lie in crowds upon the shore with their pups and spend much time in sleeping. The pups, however, directly in the first days play together like children, and imitate their parents in playing at copulation, and practice fighting until one throws the other to the ground. When the father sees this he rises up with a growl and hastens to separate the combatants, kisses the victor, licks him with his tongue, tries with his mouth to throw him upon the ground, and makes vigorous demonstrations of his love for the youngster, who struggles bravely against it. In short, he rejoices that he has a son worthy of himself. But they are less fond of the lazy and ease-loving pups. Hence some of the young are always near the father, others near the mother. The males are polygamous; one often has eight, fifteen, or even fifty wives. He guards them with anxious jealousy, and goes into a rage if another male comes ever so little too near.

Although many thousands of them lie upon the shore together, yet it may always be observed that they are separated into families — the one male lies with his wives, his sons, and daughters, as also his yearling sons who are not yet old enough to have a harem. One family often numbers as many as 120. For this reason also they swim in the sea in shoals.

All the married ones are vigorous, but the aged and those that are too old for the warfare incident to keeping up a harem, or that are driven to it by impotence or the voluntary desertion of their wives, lead a monastic life, and pass it constantly in fasting and sleep. These married ones are the fattest of all, and without the females they come first to the island, like scouts. All the males have a strong odor, but theirs is the worst. These old animals are very cross and very savage. They live a whole month in one place without food or drink; they sleep all the time, but rage with exceeding fierceness at all who pass by. Indeed, they are so very fierce and jealous that they would a hundred times rather die than give up their place. And so if they see a man they go out to get in his way and prevent his passing; one of the others meanwhile gets his place and is ready to fight with him. When we were obliged to come into conflict with them because of the necessity of continuing our journey, we threw great stones at them. They in turn would rage at the stone thrown at them just as a dog would, and start up in defiance and fill the air with their terrible roaring. What we first attempted was to knock out their eyes and break their teeth with stones; even though wounded and blind they would not give up their place or dare to leave it; for if one of them went even a pace away, so many enemies would rise up and attack him with their teeth as he fled that he should not leave his place, that even if he escaped our hands he would be torn to pieces by his fellows. Indeed, if one leaves his place, the rest run up to prevent his flight; one attacks the other on suspicion of wishing to flee, and from a single attack so many duels originate that oftentimes for 2 or 3 furlongs by the seashore you can see nothing but duels, battles, and a thousand sights absurd but bloody, accompanied

by a terrific roaring and growling. While they fight with one another they let us alone, and we are able to pass by unmolested. If two fight against one, another comes to his aid, for they can not bear to see an unequal combat. When there is fighting going on, others who are swimming in the sea lift up their heads to see the outcome of the contest, and finally they are worked into such a rage themselves that they come on shore and mix in crowds with the combatants and make the sight more awful. I often went with my Cossack and attacked one on purpose and knocked out his eyes; and when I had done that I pelted four or five others with stones. When these pursued me I took refuge near the one I had blinded. As he could not see but heard his brothers in pursuit and did not know whether they were fleeing before us or pursuing us, he would attack his fellows. Meanwhile, quite at my ease, I would sit down in some high place and watch them fighting together for some hours. The blind one would attack all that came near, whether enemies or friends, and was pursued by all as a common foe. If he fled to the sea he was pulled out again, and on land was torn by their constant blows until he lost all his strength, and falling down breathed out his angry soul amid constant groans, and became a prey to the hungry droves of blue foxes which attacked him with their teeth as he lay there still breathing.

While two often fight for an hour, they make a truce, and both lie down near one another, panting to get their breath. When they are recovered they both get up and in gladiatorial fashion take a certain place and refuse to leave it as long as the fighting. continues. They duck their heads and strike back, and one tries to ward off the blows of the other. As long as they are evenly matched they strike only with their front flippers, but as soon as one gets the advantage of his adversary he tears him with his teeth and jaws, shakes him, and throws him down. Then the others, who have meantime been mere spectators, seeing this, hurry up to assist the weaker one, as if they were umpires in the fight. With their teeth they inflict wounds as large and cruel as if they were made with a saber. At the end of July a sea bear is seldom seen that is not marked with a wound. After a battle the first thing they do is to go into the water and bathe their bodies.

They fight mostly for one of three reasons: (1) The most bitter warfare is about their wives; trouble begins when one steals those of another, or even tries to take the grown daughters from the father's family. But the females get up at once and follow the one that comes out ahead. (2) They fight for their place if one takes the place of another, or if the space is too small and another, out of lust, gets too near and excites his suspicion. (3) They fight for right and justice, to settle disputes.

They are very fond of their wives and their young, and are much feared by both. They get in a towering rage with their young for the most trivial causes and practice a tyrants right.

Often we entered the harem and stole the pups. In these cases, when flight was possible, if the mother through fear left her pups and did not snatch them up in her mouth and take them with her, but left them where we could get them, the male without entering into any quarrel with us snatched the female up in his teeth, lifted her up high, and threw her in a rage two or three times against the rocks with such violence that she lay still as if dead. But when her strength returned she would crawl like a worm as a suppliant to his feet, and kiss him, and shed tears in such quantities that they ran down on her breast as from an alembic and made it all wet. For a time he would walk back and forth roaring and rolling his eyes terribly, and would shake his head from side to side like a bear; but at length when he saw that we were going to go away with the pups, he would weep in the same way as the female, and just as copiously, so as to flood his whole breast, even to his feet, with tears. The same thing occurs when he suffers grievous wounds or some severe

injury which he can not avenge. I have seen captive seals weep in a similar way.

A second reason why the sea bears in early spring go east to these desert islands is doubtless this. By rest, sleep, and a three months' fast, they must rid themselves of their burdensome fat, in the same way as land bears do in winter. For during the months of June, July, and August, they do nothing except sleep upon land, or lie at ease in one spot like a rock, and look at each other, roar, kiss, and stretch, taking neither food nor drink. One in particular I noticed lying in the same spot for a whole month. Although at different times I dissected the old males, yet I found nothing at all in their stomachs except froth and gastric juice, and no faeces in the bowels. Furthermore, I noted that meanwhile the layers of fat wasted away more and more, the size of the body becoming diminished and the skin becoming so loose that it hung like a sack and swayed with each motion of the body. The younger ones that are not so fat begin to cohabit about the first of July; they are active and run here and there, living on land and in the sea by turns. This fact convinced me still further that in accordance with his nature I should call this animal a bear.

They cohabit after the manner of the human kind, the female below and the male above, and especially near evening time do they desire to indulge their passion. An hour before, male and female cast themselves into the sea and swim around quietly together. Then they come back together, and the female lies flat on her back while the male comes up out of the sea upon her. He seizes her in his arms and indulges his passion with the greatest heat. During the coition he presses the female down and buries her in the sand by his weight so that only her head sticks out, and he himself digs into the sand with his front feet, so that he presses down and touches the female with his whole belly. For this they choose a sandy spot upon the very shore, where the waves come even to the place. So absorbed are they and so forgetful of themselves that I could stand near them for more than a quarter of an hour without being observed. And I should not have been seen even then had I not struck the male a blow, whereupon with a great uproar he attacked me so wrathfully that I got away with difficulty. But nevertheless when I gained an eminence from which I could look down he went on for another quarter of an hour with what he had begun.

These animals have three different kinds of speech. To pass away the time while they lie upon the land they cry out, and their voice is not at all different from the lowing of cows when deprived of their calves. In battle they roar and growl like a bear, and if they get the victory they utter a very sharp and often repeated note like our common crickets. But when wounded and overcome by their enemies they groan terribly or hiss like a cat or sea otter.

When they come out of the sea they shake their bodies and wipe off their breasts with their back flippers, and smooth their fur. The male places the tip of his lips to those of the female as if to kiss her. When the sun shines clear in the sky they lie down and raise their back flippers in the air and move them in the same way as a dog wags his tail. They lie sometimes on their back and sometimes on their belly like a dog, sometimes curled up in a ball, sometimes stretched out on one side with their front flippers resting on the side. But although they sleep soundly, and though a man may approach softly, nevertheless they are speedily aware of his presence and get up, whether informed by hearing or the sense of smell I know not.

The very large old ones never run away from a man or a crowd of men, but prepare at once for battle. Nevertheless, I have seen whole herds put to flight if a man whistle. The females flee in haste, and likewise whole droves of adult males, even many thousands, are driven in headlong flight to the sea, if suddenly, when they feel secure, they are attacked with a great noise. But when, as often, we drove many thousands of them

before us into the ocean, those that were swimming accompanied us constantly as we walked along the shore, gazing in wonder upon their unusual guests.

They swim so rapidly that in an hour they can easily swim two German miles. If they are wounded at sea with a harpoon they draw the boat with the hunter after them so swiftly that the boat seems to fly, and they often overturn the boat and drown the hunter unless the steersman prevents it by watching and skillfully directing his course; they swim with the back sloping, and the front flippers are never seen, but the back ones sometimes project up from the water. On account of the open *foramen* they stay a long time under water. But they afterwards come up to breathe, with their strength much exhausted; they delight to swim around near the shore and swim now prone and now on their backs, but not far under water, so that I was always able to make out their course. They often raise their hind flippers out of the water. When they have breathed enough, or when they first start into the water from the land, they plunge into the water head first like a wheel, as do almost all the larger sea beasts — the otter, the lion, the balaena orca, and the porpoise.

When they climb a rock, they take hold of it with their front flippers as seals do, and drag the rest of their body behind them, bending the back like a bow and holding the head low, to give elasticity to the body. In swiftness they almost if not quite excel the swiftest runner, and the females are especially fast. There is no doubt that many of us would have been killed by them if their legs were worth as much on land as they are in water. And, indeed, it is not wise to fight with them even in a large level place, for there one can get away with difficulty. Steep places were always our refuge of safety, because they can not climb up them. They sometimes laid siege to me for more than six hours, and at length compelled me, at very great peril of my life, to ascend a precipice, and in that way to escape from the infuriated beasts.

If I were required to state how many I saw on Bering Island I should truthfully say that I could not guess — they were countless, they covered the whole shore. Not infrequently they obliged me and my Cossack, in our rambles this way and that through the entire island, to leave the shore and prosecute our journey with difficulty over the tops of the hills.

The sea otters are very much in fear of the sea bears, and very seldom come in among them, and it is the same with the seals. But the sea lions live among them in great herds and are much feared by them. They always have the best places. The sea bears do not like to stir up quarrels when the sea lions are present for fear they have these savage beasts as umpires; for they run up immediately, as I have sometimes seen. So also they dare not try to prevent their females from playing with the sea lions.

And, by the way, this is a curious fact, that the sea bears are not found everywhere on the shores of their islands, as are the sea cows, the seals, the otter, and the sea lions, but only on the southern shore, which faces Kamchatka. The reason of this is obvious — for they see this part of the island first when they come on their journey eastward from Cape Kronotski. They are not found in the northern part unless they have strayed there by mistake.

Now about the hunting of these animals. Those that we first blinded on land with stones were afterward dispatched with clubs without any artifice. But the beasts are so tenacious of life that two or three men beating only their heads with clubs could scarcely kill them with 200 blows, and frequently would have to rest and refresh themselves two or three times. When the cranium is broken into little bits and almost all the brains have gushed out, and all the teeth have been broken, he still attacks them with his flippers and keeps on fighting. I have purposely broken the skull and put out the eyes of one and then left him, and afterwards for more than two weeks he still stood alive and unmoved, like a statue, in the same place.

In the sea around Kamchatka they very seldom come ashore on the mainland, but they are wounded at sea by the natives with an iron spear called "*nosok*" which detaches from the handle and remains in the body, and this iron part of the spear, because inside it is oblique to the wound, sticks fast. It is bound to a stout thong, the other end of which is held by those sitting in the boat. But the wounded animal flees very swiftly like an arrow, and takes the boat and men along with him, until he pauses, worn out and exhausted with loss of blood. As soon as he pauses they draw him up to them by the thong and pierce him with spears, and if he attempts to upset the boat they crush his front flippers and his head with axes and clubs, lift him dead into the boat, and hasten home. By preference in spring they kill the pregnant females and the young males. But they dare not attack the large, old males, but when they see one they say "*Sipang*" (the devil), for they mean by that to call the big fellow evil and destructive. So likewise they say if they see a sea lion or a very large sea bear on land when they have no companion or weapons.

Very many sea bears die a natural death from old age on this island every year, and as many more fall in battle and die from the wounds that they have received; so that in some parts the whole shore is covered with bones and skulls, as if great battles had been fought there.

I can not omit to mention that these animals have a very large thymus gland, composed of many little glands, and rolled up in a membranous sac. I have made an incision into a branch of the main artery of the lungs, and when I inserted a little tube and blew in with my mouth I discovered that not only the ventricles of the heart but also the thymus gland swelled up. I would rather not suggest what others may conclude in regard to this, unless I could make many more experiments on other sea beasts.

Here, at the end, I will mention that it is a very curious thing what the explorer, Dampier, says of the Island Ferdinand (Juan Fernandez), below 36° south latitude, he asserts that there upon the land he found the whole shore covered with countless herds of seals, sea lions, and sea bears, in the same way as we found it in Bering Island. This does not lead me to believe that these animals come hither from those Southern latitudes, for this distance would be far too great, but I gather from it two facts: first, that the sea beasts of the southern hemisphere are the same, or not very different, from those of the northern in about the same longitude; and, second, it is credible that our sea bears spend the winter at about the same degree of north latitude. Perchance some time fate will grant that since we have found their summer camping ground others may somewhere discover their winter home; if this be not the land called "*Compagnie land*" perchance it may be a land lying not far away and some time to be discovered.

I have had two pictures made, of which the former represents a male resting on a rock, as they are generally seen; and the second, a smaller female lying upon her back. I have her represented in this position chiefly for the reason that the shape of the hind leg may appear, and this could not be brought out true to nature if she were in sitting position.[1]

As to style and arrangement of matter, pressure of duties does not permit me to spend too much time in perfecting any one thing, unless I am to allow many things to go to waste upon my hands. I therefore set out my porridge in carefully made earthen vessels. If the vessel is an offense to any one, he

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[1] Tab. XV, online at http://dz-srv1.sub.uni-goettingen.de/sub/digbib/loader?ht=VIEW&did=D151405

will perform for me and others a most friendly service if he will pour it all into a gold or silver urn. As to the fact that I have noted the minutest circumstances, I did it for this reason: that I might omit nothing that I learned from careful watching. For the rest, I guarantee that I say nothing that is not most true; an account can always be made shorter, but not longer or fuller, if it has been from the outset restricted within rather narrow limits.

THE SEA LION[1]

Description of the beast of the sea named by Dampier the sea lion, by the Kurils, Kamchatkans, and Russians "Siwutscha." Described on Bering Island the 20th of June 1742.

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Habits and characteristics

These beasts are indeed terrible to look upon when alive; and they far surpass the sea bear in strength and size as well as in endurance of the different parts. They are hard to overcome and fight most viciously when cornered. They also give to the eyes and mind the impression of a lion. Nevertheless, they fear so much the very sight of man that if they see one even at a distance they rush in headlong flight from the land into the sea. But if, when they are sound asleep, a man comes up near and wakes them by a blow from his stick or by a loud noise) they take to flight at once, panting like a furnace, and with their limbs shaking so with fear that they can not control them. But if one of them is cornered and all chance for flight is shut off he turns against his enemy with a great roar, shakes his head in wrath, rages, cries out, and puts even the bravest man to flight. The first time that I tried this experiment was almost the last of me. On this account this animal is never hunted at sea by the Kamchatkan tribes, because he overturns the boat of the hunters and slays them most savagely. Nor does anyone dare engage him even on land in open battle, but he is caught by guile when off his guard and quite at ease, or even sound asleep. When the beast is asleep on land, the hunter who has most confidence in his strength and swiftness, creeps silently up to it with the wind in his face and plunges into it under its fore flippers an iron or bone spear called a "*nosok*." It is made to fly out of its socket and is fastened to a thong made from the skin of this very animal. The other hunters keep the thong, which is wound several times around a rock or a stake driven deep into the ground. While the beast that has been wounded and aroused attempts to get away, the other men shoot arrows at it from a distance, or transfix it with a second spear fastened to a thong. At length when its strength is gone they pierce it with spears and kill it with clubs. But when they attack it they attack it asleep on the shore where there are few rocks; they shoot poisoned arrows, and then run away. The animal is compelled by the poison to come on shore, as the salt sea water increases the pain of the wounds; and then, if the place is a convenient one, he is stabbed, or otherwise, if left to himself, he will die of the poison in twenty-four hours. All who have the skill and daring to hunt this beast, and who have killed many, are held in great honor by their fellows, and are regarded as heroes and braves. Accordingly the love of glory, as well as the excellence of the flesh, turns many to the hunt and makes them ready for hazardous enterprises. They often load their boats with two or even three of these animals, till they threaten to sink in the water. But they are so skillful that this seldom happens in the smooth sea, even though the rim of the boat may be even with the surface of the water. They consider it a great disgrace if, through fear of death, they abandon the quarry that they have once secured, so that if their hands should not avail to bail out the water they would sink. To hunt this beast the bravest men go out to sea in their light canoes four or five German miles to the uninhabited island called Alait. And it not infrequently happens that the sailors without a compass are taken by a contrary wind four, five, or even eight days out to sea without anything to eat, and see neither island nor mainland, and have only the rising and setting of the sun and moon to direct them.

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[1] The Miller translation omits 2 pages of introductory description.

The blubber, as well as the sweet flesh, is well flavored and highly prized, and the gelatinous flippers are considered a prime delicacy. The fat is not greasy, like that of seals and whales, but is stiff, and resembles that of sea bears in color, but not in flavor and smell. The fat of the young is sweeter than mutton tallow and resembles the marrow of leg bones. From the skin they make thongs, the soles of shoes, and even shoes themselves and leggins.

They are polygamous. One male has two, three, or four females. The pups are born on land about the beginning of June — one only at a birth, and are suckled by their mothers. They come together in August and September, hence the young remains in the womb nine months, as indeed seems reasonable. They copulate like the sea bears. The males hold the females in great respect and do not treat them so harshly as the sea bears do their wives. They delight exceedingly in the caresses of the females and count their affection worthy of much more demonstrative return. The males, like the females, have a very indifferent love for the pups. The mothers when asleep sometimes crush the young at their udders by their weight and kill them, as I have often seen, and they were not the least bit disturbed when, as often, I cut the throats of the young, even before the eyes of their parents and threw the entrails to them. The pups are not so lively and active as those of the sea bears, but sleep all the time or play a little in a lazy way, and indulge in amatory sports. At eventide the mothers with the young go out into the sea and swim quietly near the shore. When the pups get tired of swimming they are wont to perch upon the backs of their mothers and rest. But the mother rolls over like a wheel and shakes the lazy pups off, and accustoms them to swimming. As an experiment I have thrown young sea bears and equally young sea lions into the water; but they were so far from being able to swim or to use their flippers well that they beat the waves irregularly with their flippers and hurried to the shore. The pups are twice as large as those of sea bears.

Although these animals are exceedingly afraid of man, yet I have seen them grow used to him and become tame by meeting him frequently without injury, and especially at that time when the pups had not yet learned to swim easily. I lived a season in the midst of a herd of them, and for six whole days on a spot above them, where from my hut I watched their habits carefully. They lay around me in every direction; they watched my fire and what I did, and did not run away any longer even when I walked around among them and took their pups and killed them and examined them. They practiced coition, fought jealously for their wives and for the best places, and fought most bitterly in just the same way and with the same motions and the same heat as the sea bears do. One from whom a female had been taken fought with all the rest for three whole days, and was wounded all over in more than a hundred places. The sea bears never mingle in their fights, but if a quarrel arises they run away, looking all around them. They yield them the choice of places and allow their females and pups to indulge in various sports, and dare not object. As far as possible they avoid all dealings with the sea lions, but these, uninvited and unwelcome, often mix in their quarrels. The old and decrepit among them grow white around the head, and beyond all doubt these beasts are very long-lived. They scratch their ears and head with their hind flippers, as the bears do, and stand, swim, lie down, and walk in the same way. They low like cows and the young bleat like sheep, and while I was among them it seemed to me as if I were playing shepherd and were mingling with herds of cattle. The old and worn-out emit an odor, but far milder and less offensive than that of the sea bears. They are found in this island in spring, as well as in winter and summer, but only in certain parts — those that are rocky and near precipices. Nevertheless, others come here every year along with the sea bears. I have seen them in great numbers along the American shores. They are found in Kamchatka almost all the time. They do not go above 56° north latitude. They are hunted a great deal near Cape Kronotski and around the island Ostrovnaia, around Avatcha Gulf, and from here as far as Cape Lopatka. They are found in the Kuril Islands and almost as far as Matmej Island. Captain Spangberg on his chart has named a certain island from the number of these animals that he found upon it, and from a cliff overhanging their city, the "Palace of Sivutch." The sea lion is never seen in the Penshin Sea. The reasons why these beasts come hither in June, July, and August, are for quiet, for parturition, for rearing and teaching the pups, and for copulation. Before and after this period they are found in greater numbers on the shores of Kamchatka.

As to the food of these beasts, they prey upon fish and seal especially, and also upon otter and other sea animals. The old ones eat little or nothing at all in June and July, but take their ease and sleep, and at the same time become very thin.

THE SEA OTTER[1]

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Habits and Characteristics

These animals are very beautiful, and because of their beauty they are very valuable, as one may well believe of a skin the hairs of which, an inch or an inch and a half in length, are very soft, very thickly set, jet black and glossy. The soft underfur also among the longer hairs is black; but the tips, or the hairs from the middle on, are black, while the bases or roots are whitish, lustrous like silk, and silvery. The most valuable skins are almost perfectly black; others are found with silvery fur shining quite white all over, but they occur very rarely. Although as time goes on they change the color of their hair, they are still much more constant than the sables, and sable skins never shine with so deep a natural blackness as the otters. The one thing to be deplored is that the skin is too thick and heavy, and for that reason is less pleasing to the eyes of the gentler sex; for the skin of an adult otter weighs, on an average, 3½ pounds.

Rarely is an otter caught that is black all over; the head of the best grade of otters is silvery gray; the cheaper grade of otter has a head of a tawny color and yellowish fur; and the lowest grade of otter is that which has no long hair, and is clad only in short, dirty-gray fur. With these animals matters stand like this: the skins of certain animals always grow red hairs, rarely very long, while the animals themselves are stupid, sluggish, surly, sleepy; they lie forever asleep upon the icy rocks; they move slowly, and can be captured without any painstaking or ingenuity, as if they knew that because of the inferiority of their hides they were not very seriously exposed to death. Many of them, however, have most beautiful tails, covered with long, black fur. From these considerations I have come to two conclusions. (1) That the skins of sluggish animals are overgrown with only short hair, for the simple reason that in summer time, while they roll about in the sand, the longer hairs are worn off by the constant friction, and in the winter, while they lie upon the damp ice, the longer hairs stick fast to the ice, and are pulled off when the animal moves. This I have seen with my own eyes. (2) That black hair, through the influence of air and sunlight, grows lighter and feebler, and so the tail, as it is curled under the lying animal, is less exposed to friction and to the rays of the sun, and so preserves the original blackness and length of hair. The more active and cunning and fleet the animals are, the more beautiful is the fur with which they are covered, and again, unlike the others, they are captured but rarely, and that only by well-laid snares. Such animals are so careful about their own safety that if they come out on dry land alone to sleep, they look around very carefully, and, inasmuch as their eyes are not very strong when on land, they turn their noses in every direction before they go to. sleep, to make sure that no man is in the neighborhood — and then, even though they perceive no sign whatever of danger, they do not get far away from the sea. They often wake up with a start, look around, and never sleep very soundly. But if whole herds sleep together on the land, the finest looking leaders [of the herd] stand on sentinel duty, and arouse the rest if any danger threatens.

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[1] The Miller translation omits 15 pages of measurements and descriptions of the external and internal parts.

The skins of females can be distinguished from those of males at the very first sight, because they have shorter, finer,

more beautiful hairs on their backs and longer ones on the belly; the flesh of the females is more tender, more savory, and more delicious because of the distribution of the fat. In the former respect they are different from quadrupeds and birds, for in these classes it is the males that are covered with the more beautiful hair and feathers and the brighter colors.

They do change their hair, however, like land animals and birds, but with this two-fold difference: some lose their hair in the months of July and August, but they lose very little of it; the others change their color somewhat and come out a darker gray, and are for that reason called by the Russians and merchants "Letnie Bobry," and are sold at a smaller price. The most prized skins are those which are taken from animals in March, April, and May.

The adult males are called "*Bobry*," the females, "*Matka*," and the one-year-olds, which have taken on the soft, short fur, "*Koschloki*"; the cubs are called "*Medviedki*," or "little bears," because they have very long, thin, tawny hair like bears; their skins can scarcely be distinguished from the skins of the young bear, but after five months they lose their hair, and then they are called "*Koschloki*," as intermediating between the cubs and the one-year-olds, and are then covered only with soft, downy fur.

Upward of fifteen years ago, the finest skins were exchanged by the natives in the land of Kamchatka for knives and firearms, and were sold by Russian merchants for 5 or 6 rubles; those of medium quality sold for 4 rubles; those from the Yakut sold for 8 or 10 rubles. But ever since the Chinese began to appreciate and earnestly to covet these wares the finest skins of the adult animal were sold even in the land of Kamchatka for 25and 30 rubles; those of medium quality for 17, while 1-year-olds (those called "*Koschloki*") brought 8 rubles, and cubs 1 ruble. Tails were held at a particularly high price, and were purchased for 1½ or even 2 rubles, and were much sought after for caps and mittens.

Very few are brought to Russia; almost all are taken to China, where the best ones command a price of 70 and 80 rubles. In 1735 and 1736 they were quite ready to offer 20 rolls of "*Kitaika*" for one skin, while the Russians on their return to Irkutsk obtained for it 100 rubles.

These skins, moreover, being rather heavy, are for that reason dearer to the Chinese than the skins of sables and foxes, and they are better suited to increase the weight of the too light silk gowns. In addition to their beauty they make the silk fit more closely to the body and resist the wind better; and for those reasons the Chinese make of this fur borders of a hand's breadth and put them around their robes on every side; and this has become the fashion also with both sexes, not among the tribes of Kalmuc and Siberia only, but also in Russia. In the land of Kamchatka nothing is considered a finer adornment than a dress sewed up like a sack (a "*Parka*" they call it), made out of the white skins of reindeer fawns (called "*Püschiki*") and having a border of sea otter fur around it. Mittens and caps are also made of sea otter fur.

In addition to their weight, these skins have also this disadvantage, that they retain too little heat about the body and become moist, although, because of their thickness, they do afford excellent protection against the violence of the wind.

Up to a few years ago the people there also used to make their clothes out of those skins, as they did long ago out of the skins of foxes and sables (*Zobelae*), but that custom has gone out of date now that their value has increased so much, and they are not very much aggrieved at that change of fashion, for the people there have always looked on dog skins as warmer, more beautiful, and more lasting.

The hides of the cubs have this advantage, that they heat the body less than fox skins do.

These animals are captured only on the shore of Kamchatka, from 50° to 56° north latitude. They are never seen in the Penshin Sea, nor are they observed to go beyond the third Kuril Island. From this fact, and from the hunting of the animal, the ocean from the neighborhood of Lopatka to the Promontory of Kronotski has received the name of "Bobrovi Sea." For a long time back it has been believed by the people, as well as by Russians, and asserted that this animal is not an Asiatic, but a stranger in that region and a foreigner from other lands that lie quite near Kamchatka, where they are taken every year. When the east wind blows for two days together in the winter time, they are floated over with the ice on which they have been lying, and so are caught. Those which escape death in the winter stay in the summer about the rugged and rocky shores of Kamchatka and the Kuril Islands, give birth to their young, and remain there; for they have not the strength to swim away, and, on account of the *foramen ovale* of the heart, they can not while swimming over the sea seek their food in its depths; neither can they hold out against hunger for three or four days.

The hunting of the otter is on this wise: if the winter has been cold and great quantities of ice are repeatedly blown over, there will be an abundance of sea otter not only in winter, but also, from those that survive, in the summer; and, on the other hand, from the year 1740 to 1743 there was no cold weather in this locality, no ice could be frozen about the shores and brought over there, and so the otter were few and the hunting exceedingly limited.

The region famous for the hunting of the otter twenty years ago extended from the mouth of the Kamchatka to the Tchaschma, and was more renowned for that than any other place; now, however, it is but little and rarely used. Hunters came in greater numbers about the Promontory of Kronotski, which has come to be most frequented next after the mouth of the river Kamchatka; but there also the catch has grown smaller. About Ostrovnaia, the Gulf of Avatcha, the Promontory of Lopatka, and the first three Kuril Islands they are now caught in much greater numbers than before. The Penschin Sea they do not enter, although crabs and other shellfish are to be found there in at least as great if not greater numbers than on the Kamchatkan shore. But why they do not go beyond the first three Kuril Islands, although they might easily pass from one to the other and so on clear to Japan, admits of a three-fold explanation. (1) Because the sea lions and sea bears, inhabiting the desert islands in very great numbers, devour the sea otter and injure them in every possible manner, the latter are very much afraid of them and are driven away. (2) There is never any ice in those regions, and so no sea otter are ever brought. (3) The distance between America and the farther Kuril Islands is very great, and there are no islands in between, and so these animals cannot reach them by swimming. Besides, these creatures are not naturally of a roving disposition but if they might find a suitable place designed, as it were, for them, even so the inhabitants of the first islands are so bent on hunting them that those which have managed to escape in winter rarely escape in summer. They hunt the otter in all seasons, but in most diverse manner according to the demands of the season. They are captured in greatest numbers in winter, particularly in the months of February, March, and April, but their capture is made at the expense of tremendous exertion, great daring, and not infrequently loss of human life. When in the months before mentioned the east wind blows for two or three days in succession, a vast quantity of ice is carried over from the American shore; the ice comes over even more quickly if it has been carried away in the autumn and held in the channel between the islands. While the wind blows, the hunters lie in wait in their straw-covered huts; the ice drifts in in so great quantities that it fills the surface of the sea for several miles out from land in the region of the Kuril Islands, and oftentimes connects the Promontory of Lapatka with the first island. Then the hunters, arming themselves with clubs and knives, put on their snowshoes (called

"*lapki*"), and either alone or attended by dogs go out upon the ice. With their clubs they kill the otter they find in a few moments, moving continually the while that they may not break the ice. They have the skins carefully pulled off, and leave the carcasses, if they be too far from the shore. Meanwhile the dogs hunt out others. When the otter catches sight of the dog and the dog stops, the otter is brought terrified to bay, and attempts to hide, until the hunter, following the footprints of the dog, comes upon his quarry and dispatches it. So eagerly do they pursue the hunt that they often go out so far upon the ice that they get out of sight of land.

If, as often happens, the ice is brought in with a gale or tempest and a heavy fall of snow, the catch, is even larger, but fraught with greater danger; for when the hunters can not look ahead nor see the holes in the ice at their feet, they must follow their dog or mere blind chance. This most venturesome chase can not be witnessed from the land without terror. The ice rises and falls with the waves; the hunters walk now upon a mountain which was but a moment before a valley or a deep pit; again they are lifted up on high, and again they sink and disappear from sight. But the best and easiest hunting takes place when the ice remains on the shore for a long time; for while the tempest lasts, the otter, not knowing whether they are on the floating ice or on the land, go inland 5, 10, and even 15 furlongs. For they are misled by the roaring of the wind in the trees and bushes and think they are going toward the sea, and that what they hear is the roar of the waves. In this way a single huntsman often kills as many as thirty or forty or more, and saves the meat as well as the skin.

While the people hunt upon the ice, they are generally very careful to observe the winds, for fear that by adverse winds they be carried, as not infrequently happens, out into the open sea. It is not a rare thing for them to float up and down with the ice upon the waves for three, four, five, and even six days, and then, with favoring fortune and favoring winds, to be brought in again and come safely to shore. When the wind blows from the other quarter the ice is drifted away. If it drifts along the shore, the hunters follow the ice continually, for while the ice is drifting away, whether by day or by night, the otter try to get back upon it again, and so the latter part of the hunt is often richer than the beginning. The hunters wear snowshoes, in order that the ice, which is often very thin, may bear their weight, and keep them from breaking through. Each shoe is from 5 to 6 feet long, 8 inches wide, and is fastened to the foot with straps.

As this hunt takes place upon the ice, it is considered good news all through the Kuril Islands, Lopatka, Kronotski, and Avatcha that the ice has come. Moreover, besides the otter, seals also and sea lions are brought in upon the ice.

The hunting of the otter is planned for in the winter time, because the colder, windier, and stormier the winter the greater the catch, and the milder the winter the poorer the catch. Although in the years 1740, 1741, and 1742 great quantities of ice with great numbers of otter drifted in, still the catch was very insignificant; but the reason was that the ice was very thin and would not hold the hunters.

In summer the otter are caught in four ways. (1) While lying upon their backs asleep at sea they are speared from boats with harpoons. (2) Even when awake they may be driven about in the sea by two boats until they are tired out and then speared, for they can not live underwater for more than two minutes without breathing. If pursued moderately, therefore, they swim along and soon get so out of breath that they can flee no farther and are forced to stop. (3) When the tide is out they take refuge on the rocks that rise up above the surface of the sea. There they sleep and are killed by the hunters with clubs. Before the advent of the Russians they used in the same way to come out on land to sleep on the shores of Kamchatka and the Kuril Islands; but ever since they began to be hunted for their skins to

satisfy the avarice of man they are never caught upon the mainland, or very rarely, when they have come there unaware. (4) They are caught in nets. The nets are spread above the water and tied with stones to hold them firmly in position in not very deep places, where sea weed grows in great quantities, for the otter feed upon shellfish and crustaceans that live concealed in the sea weeds, and there they are caught in the nets or are killed by the hunter, who comes upon them in his boat. Sometimes they carve out wooden otters, paint them black, and set them afloat. The otter, seeing these images, swim up and indulge in various strange capers about them, and by this trick are caught. When they are caught in the nets they are so frantic that in their despair they bite off their front feet, but if a male and a female are caught together they both lacerate their skins terribly and knock out their eyes.

We killed them on Bering Island with spears, nets, and, when they were lying asleep or in the act of copulating, with clubs.

They were found there in so great abundance that from the beginning our numbers did not suffice to kill them. They covered the shore in great droves, and as the animal is not migratory, but is born and bred there, they are so far from fearing man that they would come up to our fires and would not be driven away until, after many of them had been slain, they learned to know us and run. away. Nevertheless we killed upward of 800 of them, and if the narrow limits of the craft we constructed had permitted we should have killed three times as many.

As to the beauty of the animal, and particularly of its skin, this sea otter is alone incomparable, without a peer; it surpasses all other inhabitants of the vast ocean, and holds the first rank in point of beauty and softness of its fur.

As to its habits, it loves to live both in the water and on the land, but for the sake of sweet peace the otter inhabits in great droves, by preference, the great islands of the ocean. For getting food it seeks, when the tide is out, the shallow, rocky reefs overgrown with seaweed, and there devours crustaceans, mussels, clams, snails, limpets, polyps, cuttlefish. Only when forced by hunger to do so, do they eat seaweed, but they eat fish, smelt, and a little fish called in Kamchatkan idiom the "*Uiky*," which is washed in by the spring tides in countless numbers. They are also fond of meat, I have seen an otter eating the flesh of another otter which had been skinned and thrown away. It may therefore be concluded that this animal is omnivorous.

In the winter they lie some upon the ice, some upon the shore. In summer they go up the rivers and penetrate even to the lakes, where they greatly enjoy the fresh water. On warm days they seek the valleys and shady recesses of the mountains and frolic there like monkeys. They surpass all other amphibia in play and frolicsomeness, and in fleetness of foot.

On the land they lie, as dogs do, with the body curled up. As they come out of the sea, like dogs they shake off all the water before they lie down to sleep; then with their paws they wash their faces, just as cats do, smooth out their bodies, straighten out their fur, turn their head from one side to the other as they look themselves over, and seem to be greatly pleased with their personal appearance. I have also seen the males play with their genital organs like monkeys. When they are engaged in sleeking their fur they are so intent upon it that they can be killed readily.

A swift runner can scarcely overtake an otter when it runs, for it runs with many windings, in a fashion to mislead. When it sees its path to the sea intercepted and finds itself exhausted and out of breadth, it puts up its back like a cat, threatens to leap upon its pursuer, and spits like an angry cat, but we, being conscious that its anger was not dangerous, were not frightened off; and when it receives a vigorous blow upon the head it falls upon the ground, covers its eyes with its paws, and keeps them

so, no matter how many times it is struck upon the back. But if one hits it on the tail, which is extended out as the animal runs, it turns about and faces the striker in the most absurd fashion. But more frequently it happens that they fall down at the first blow and pretend that they are dead, and then as soon as they see that we turn our attention to others they suddenly take to flight. From this it would appear that the animal is very cunning. Oftentimes we would drive them into narrow places on purpose, without any thought of doing them any harm; we would hold our clubs ready, and they would fall down fawning and looking around in every direction. Then they would slowly slink past us like dogs, and as soon as they saw that they were out of danger they would hurry with mighty leaps to the sea.

When they stand up they keep their necks extended in line with the body, and the hinder part, because of the length of the legs, stands higher.

They swim now upon the belly, now upon one side, and again flat upon the back; they also swim standing bolt upright in the water.

They play together, and, like human beings, embrace with their arms and kiss each other. If they escape the club, they gesticulate in a very ridiculous manner, as if making fun of the hunter. With one paw raised over their eyes, as if bothered by the rays of the sun, they watch the man, continually rubbing their pudenda as they lie upon their backs, and then go off into the water, still watching the man steadily and urinating as they go, in the same way as sea bears and whales also do.

They copulate at all seasons, and so throughout the year the mothers are seen busy with their cubs. Whether they give birth twice within one season I would not venture to decide; but I have seen, and I have sometimes killed, mothers with two cubs, one of which was a year old and the other three or four months old. So much is certain, they never, or at most very rarely, give birth to more than one at a time. The first year after they are born they do not copulate, but the second year they do. The period of gestation is eight or nine months; and so they bring forth perfectly developed young, with eyes open and with all their teeth; the four canine teeth are smaller than common, just as I have observed, also, in the case of the sea bears, seals, and sea lions.

They suckle their young almost a whole year. They preserve their conjugal affection most constantly, and the male does not serve more than one female. They live together both on sea and on laud. The 1-year-old cubs, the "*koschloki*," live with their parents until they set up housekeeping on their own score. Barely, therefore, are females seen apart from cubs two or three months old, which are called "*medviedki*."

The females always give birth to their young on land. Whether in the sea or on land, they carry their cubs in their mouths; but when they sleep at sea they fold their young in their arms just as mothers do their babes. They throw the young ones into the water to teach them to swim, and when tired out they bring them to shore again and kiss them just like human beings. They toss the young out into the sea and with their paws catch them when tossed, like a ball; and with them they engage in all the delightful and gentle games that a fond mother can play with her children. When the mother sleeps on shore the cubs keep watch, clinging to her dugs or arms. They embrace their young with an affection that is scarcely credible. When hunters press upon them, whether by land or by sea, they seize their young with their mouths and never let go of them except when compelled by extreme necessity or death itself. And so they are killed often when they might have got away themselves. I have sometimes deprived females of their young on purpose, sparing the mothers themselves, and they would weep over their affliction just like human beings. I once carried off two little ones alive, and the mothers followed me at a distance like dogs, calling to their young with a voice like the

wailing of an infant; and when the young ones heard their mothers' voice they wailed, too. I sat down in the snow and the mothers came close up and stood ready to take the young ones from my hand if I should set them down in the snow. After eight days I returned to the same place and found one of the females at the spot where I had taken the young, bowed down with the deepest sorrow. Thus she lay, and I approached without any sign of flight on her part. Her skin hung loose, and she had grown so thin in that one week that there was nothing left but skin and bones. This happened several times in succession. It happened one other time that, in company with Mr. Plenisner, I saw in the distance a mother otter sleeping with a year-old cub. When she caught sight of us the mother ran to her offspring, woke him up, and warned him to flee; but, as he preferred to go on sleeping rather than to run away, she picked him up in her paws in spite of himself and rolled him like a stone down into the sea.

On land they can not see very well, but their sense of smell is very keen. They ought, therefore, to be hunted from the lee side. Their sense of hearing is just as sharp.

The cry of the sea otter is very like the cry of an infant. They doubtlessly live many years. They never breed strife among themselves, but always live on the best of terms with one another. They are very much afraid of sea lions and sea bears, and they do not like the company of seals. Accordingly the places which those animals frequent are carefully avoided by the otter.

The flesh of the adult otter is much more tender and savory than that of the seal. The flesh of the female is best, for it is fatter and more tender, and the fat lies between little membranes. It is for that reason a little hard. In the case of pregnant mothers, the nearer they are to parturition the fatter they are. In this respect they are different from land animals. The flesh of the young otter is most delicious; it can not easily be distinguished from the flesh of an unweaned lamb, whether roasted or boiled, and the gravy from its preparing, in either way, is most delicious. Otter flesh was our principal food on Bering Island; it was also our universal medicine. By its use we were saved from scurvy, and no one got sick of it, although we ate it every day half raw and without bread. The liver, heart, and kidneys tasted exactly like those of the calf. The natives of Kamchatka and the Kuril Islands give the first preference to the flesh of eagles, the second to otter's flesh. The liver and kidneys they eat raw, and declare them most excellent. Not only the natives but also the Russians use scrapings from the bony base of the penis as the proper remedy to cure the tertian fever.

The skins go through the following processes before they are ready for use. (1) After the skin has been taken from the animal shreds of muscle are cut from it with a knife. This process the Russians call by the Slavonic term, "bolon sniat." (2) Then the skin is stretched to its utmost; for, besides the fact that the price increases with the size, the skins thus prepared become lighter, although the fur does become less beautiful. (3) After this they straighten out the hairs with bones from the wings of gulls, and sleep upon them, naked, for several weeks to make them glossier, nicer, and more beautiful. This process the Russians call *"vyspat bobr."* (4) While the Cossacks are getting the skins from the natives they frequently beat the skins upon the snow with sticks, and if the fur is gray, or any other color than black, they color them with alum and empetrum berries cooked to the proper consistency with fish oil. This makes them glossy black. But the fraud can be detected — pull out of a dyed skin a single hair and it will show three colors: at the end, the black of the dye; from the middle down, the native color; and, finally, the base of the hair.

While the skins are being prepared for use, the natives treat them also as follows: they smear the inside of the skin with a powder made of dried fish eggs, as the Rutheni do with simple yeast; then they roll it up and lay it away for several days, and

after that they scrape it with shells and glass, and finally smooth it down with pumice stone. During this time they knead the inside with a wooden hook and with the hands until it grows soft with the fermented dough of the fish eggs and all the fat disappears and the skin comes out soft and pliable. All other skins which are sold to traders are exported without any preparation, for it has been observed that these undressed skins keep their native color better.

I have wished to report about the sea otter what I have seen as an eye witness, and also what I have heard from the natives, in hunting them.

I have had two pictures made: Fig. 1 (Tab. XVI) represents an otter walking upon land, fig. 2 represents one swimming with her cub in the water.[1]

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[1] Tab. XVI, online at http://dz-srv1.sub.uni-goettingen.de/sub/digbib/loader?ht=VIEW&did=D151406

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Useful Links

Hans Rothauscher, Die Stellersche Seekuh (in German and English)
http://www.hans-rothauscher.de/steller/steller_d.htm

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Fredericksburg, VA 22401 USA
http://www.sirenian.org/sirenians.html and
http://www.sirenian.org/stellers.html

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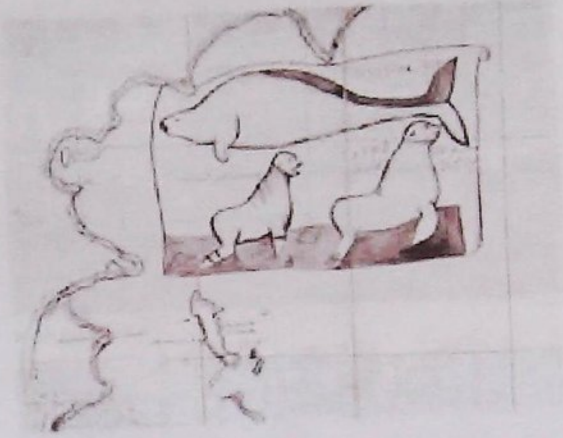
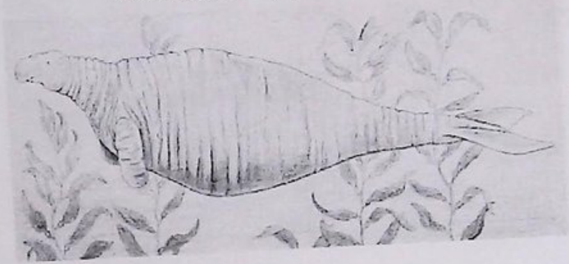
Illustrations

Steller's field sketch and map



Steller's Sea Cow (*Hydrodamalis gigas*)



Photographs from U.S. Fish & Wildlife Service Digital Library System.

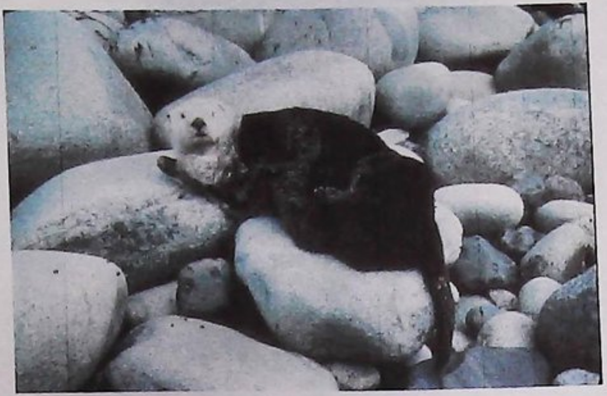
Northern fur seal (*Callorhinus ursinus*)

Steller's Sea Lion (*Eumetopias jubatus*)

Photo: Forrest B. Lee

Photo: Tom Early

Sea Otter (*Enhydra lutris*)



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Shedding Light on the Luminous Lizard (*Proctoporus shrevei*) of Trinidad: A Brief Natural History

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ABSTRACT.—A herpetological debate lasting nearly 70 years regarding the so-called luminous lizard, *Proctoporus shrevei*, of Trinidad is addressed. Published natural history accounts from the 1930s suggested that males of the species possess the ca-pability of producing light. Despite the potential significance of such a trait in a terrestrial vertebrate, no direct studies of *P. shrevei* were conducted and findings from indirect studies were equivocal. To resolve the debate, a field investigation was conducted in May 2001 and 2002 with adult *P. shrevei* in Trinidad. Evidence supported the hypothesis that the lizards' scales are highly reflective and, when combined with fluctuations in dermal pigmentation, this produces an optical illusion consistent with early natural history observations. No evidence for bioluminescence was found. However, despite being a tropical organism, *P. shrevei* displays intolerance to heat and life history adaptations to relatively cold, cave-entrance microhabitats.

KEYWORDS.—Teiidae, Trinidad, bioluminescence, thermal ecology, ectothermy.

In March 1937, naturalist Ivan Sanderson collected specimens of the teiid lizard *Proctoporus shrevei* from cave entrances near the summit of Mt. Aripo in Trinidad, West Indies (Sanderson 1939). Males of this small, cryptozoic species (Fig. 1) are dark brown with a series of white lateral spots, each surrounded by a ring of black pigment (Parker 1935; Murphy 1997). These markings became the source of controversy when Sanderson described them as being luminous. As Sanderson (1939) recounts, "...in a crevice beneath a ledge I saw a dim light which promptly went out. I flashed the torch in and there was a small lizard. Putting a net over one end of the cleft, I tickled [the lizard], but instead of running out, it turned its head away from me and both sides lit up for a few seconds like the portholes on a ship. Eventually I got [the lizard] out with forceps, and as I held it up, it again lit up brilliantly." Specimens were subsequently shipped to the British Museum in London where they were examined *post mortem* by H. W. Parker. Parker

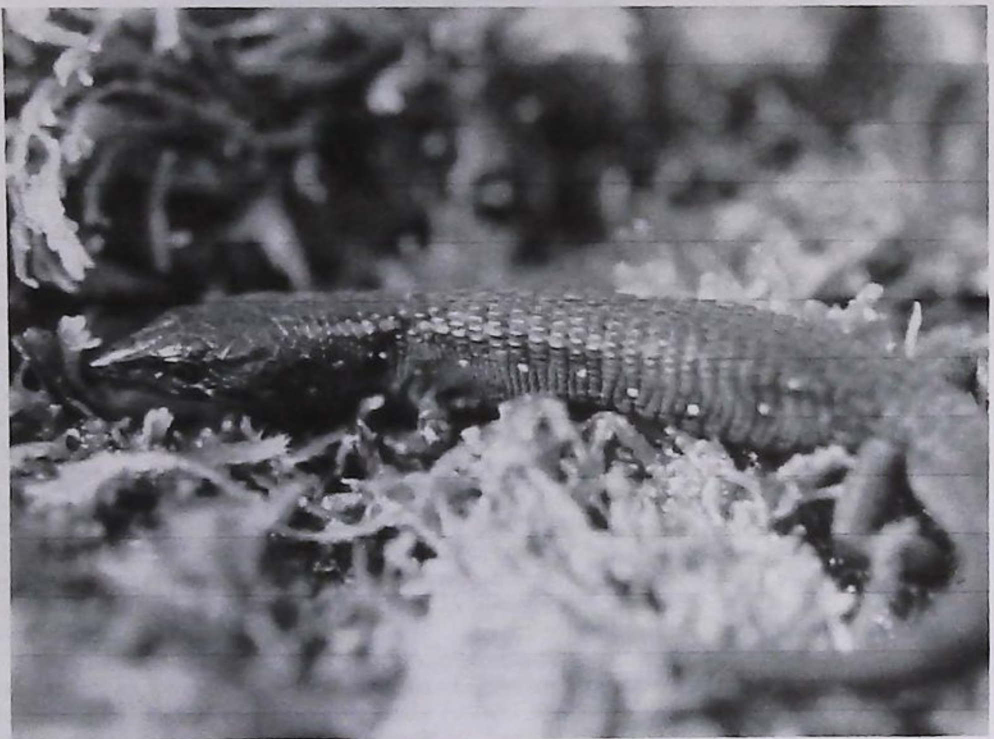

FIG. 1. The luminous lizard, *Proctoporus shrevei*, from the summit of Mt. Aripo, Trinidad. Photograph by: Mike Knight.

(1939) concluded that the translucent ocellar scales may have some connection with light and suggested three alternative hypotheses related to light production by the lizard:

1. Light is produced by an intracellular chemical reaction of some substance such as luciferin,
2. Light production occurs through phosphorescence,
3. The unique scales of *P. shrevei* are not luminous at all, but rather highly reflective.

Because Parker's evaluation was based on preserved specimens and not living lizards, no empirical evidence could be obtained to support or refute Sanderson's claim that the *P. shrevei* is capable of producing light.

Roth and Gans (1960) re-evaluated reports of the luminous lizard, providing a detailed examination of the histological structure of the ocellar scales from related species and citing unpublished observations by various biologists and naturalists. No evidence was found to suggest that *P. shrevei* or any related species is luminescent, however, Roth and Gans never made direct observations of *P. shrevei* specimens. Their conclusions, based on hearsay anecdotes and studies of related species, left the controversy surrounding *P. shrevei* unresolved. Most recently, the luminous lizard received further attention when it was featured in a popularized television documentary (produced by Discovery Communications Inc., 1999). This program sensationalized the search for *P. shrevei* in the mountainous rainforest of Trinidad. Following the capture of a single specimen, the documentary showed the lizard, in a darkened room, with what was claimed to be glowing ocellar scales. No scientific investigation was conducted, but the documentary rekindled the debate as to whether *P. shrevei* is actually bioluminescent.

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Shedding Light on the Luminous Lizard (*Proctoporus shrevei*) of Trinidad: A Brief Natural History

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Abstract.—A herpetological debate lasting nearly 70 years regarding the so-called luminous lizard, *Proctoporus shrevei*, of Trinidad is addressed. Published natural history accounts from the 1930s suggested that males of the species possess the ca-

pability of producing light. Despite the potential significance of such a trait in a terrestrial vertebrate, no direct studies of *P. shrevei* were conducted and findings from indirect studies were equivocal. To resolve the debate, a field investigation was conducted in May 2001 and 2002 with adult *P. shrevei* in Trinidad. Evidence supported the hypothesis that the lizards' scales are highly reflective and, when combined with fluctuations in dermal pigmentation, this produces an optical illusion consistent with early natural history observations. No evidence for bioluminescence was found. However, despite being a tropical organism, *P. shrevei* displays intolerance to heat and life history adaptations to relatively cold, cave-entrance microhabitats.

KEYWORDS.—Teiidae, Trinidad, bioluminescence, thermal ecology, ectothermy.

In March 1937, naturalist Ivan Sanderson collected specimens of the teiid lizard *Proctoporus shrevei* from cave entrances near the summit of Mt. Aripo in Trinidad, West Indies (Sanderson 1939). Males of this small, cryptozoic species (Fig. 1) are dark brown with a series of white lateral spots, each surrounded by a ring of black pigment (Parker 1935; Murphy 1997). These markings became the source of controversy when Sanderson described them as being luminous. As Sanderson (1939) recounts, "...in a crevice beneath a ledge I saw a dim light which promptly went out. I flashed the torch in and there was a small lizard. Putting a net over one end of the cleft, I tickled [the lizard], but instead of running out, it turned its head away from me and both sides lit up for a few seconds like the portholes on a ship. Eventually I got [the lizard] out with forceps, and as I held it up, it again lit up brilliantly." Specimens were subsequently shipped to the British Museum in London where they were examined *post mortem* by H. W. Parker. Parker

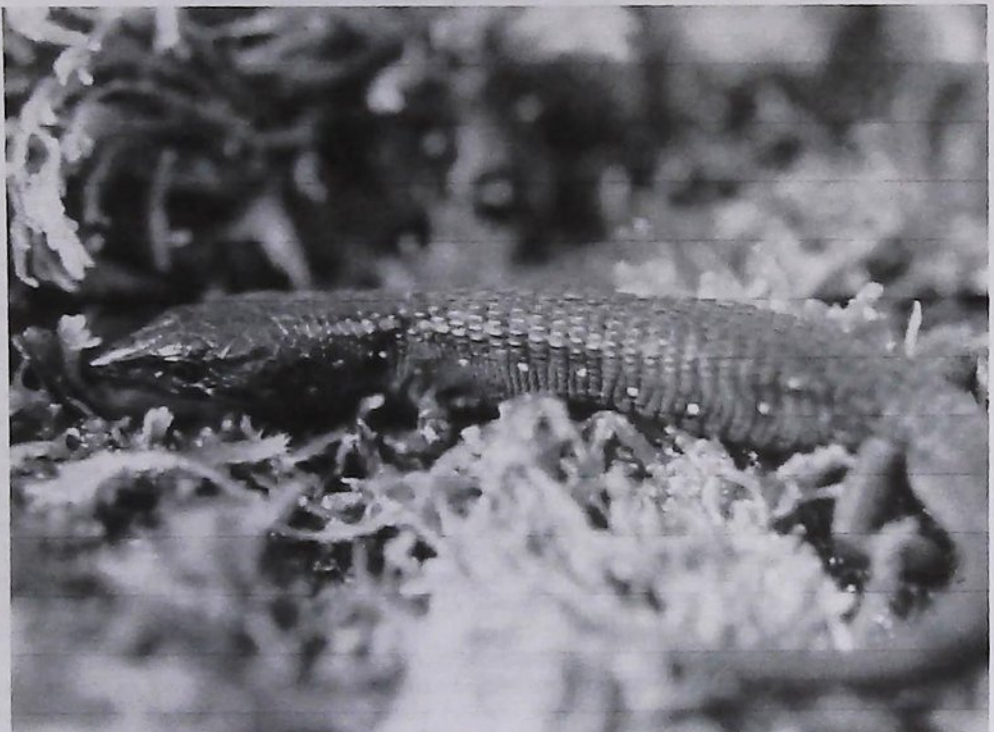

FIG. 1. The luminous lizard, *Proctoporus shrevei*, from the summit of Mt. Aripo, Trinidad. Photograph by: Mike Knight.

(1939) concluded that the translucent ocellar scales may have some connection with light and suggested three alternative hypotheses related to light production by the lizard:

1. Light is produced by an intracellular chemical reaction of some substance such as luciferin,
2. Light production occurs through phosphorescence,
3. The unique scales of *P. shrevei* are not luminous at all, but rather highly reflective.

Because Parker's evaluation was based on preserved specimens and not living lizards, no empirical evidence could be obtained to support or refute Sanderson's claim that the *P. shrevei* is capable of producing light.

Roth and Gans (1960) re-evaluated reports of the luminous lizard, providing a detailed examination of the histological structure of the ocellar scales from related species and citing unpublished observations by various biologists and naturalists. No evidence was found to suggest that *P. shrevei* or any related species is luminescent, however, Roth and Gans never made direct observations of *P. shrevei* specimens. Their conclusions, based on hearsay anecdotes and studies of related species, left the controversy surrounding *P. shrevei* unresolved. Most recently, the luminous lizard received further attention when it was featured in a popularized television documentary (produced by Discovery Communications Inc., 1999). This program sensationalized the search for *P. shrevei* in the mountainous rainforest of Trinidad. Following the capture of a single specimen, the documentary showed the lizard, in a darkened room, with what was claimed to be glowing ocellar scales. No scientific investigation was conducted, but the documentary rekindled the debate as to whether *P. shrevei* is actually bioluminescent.

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Courtesy: Gary Mangiacopra

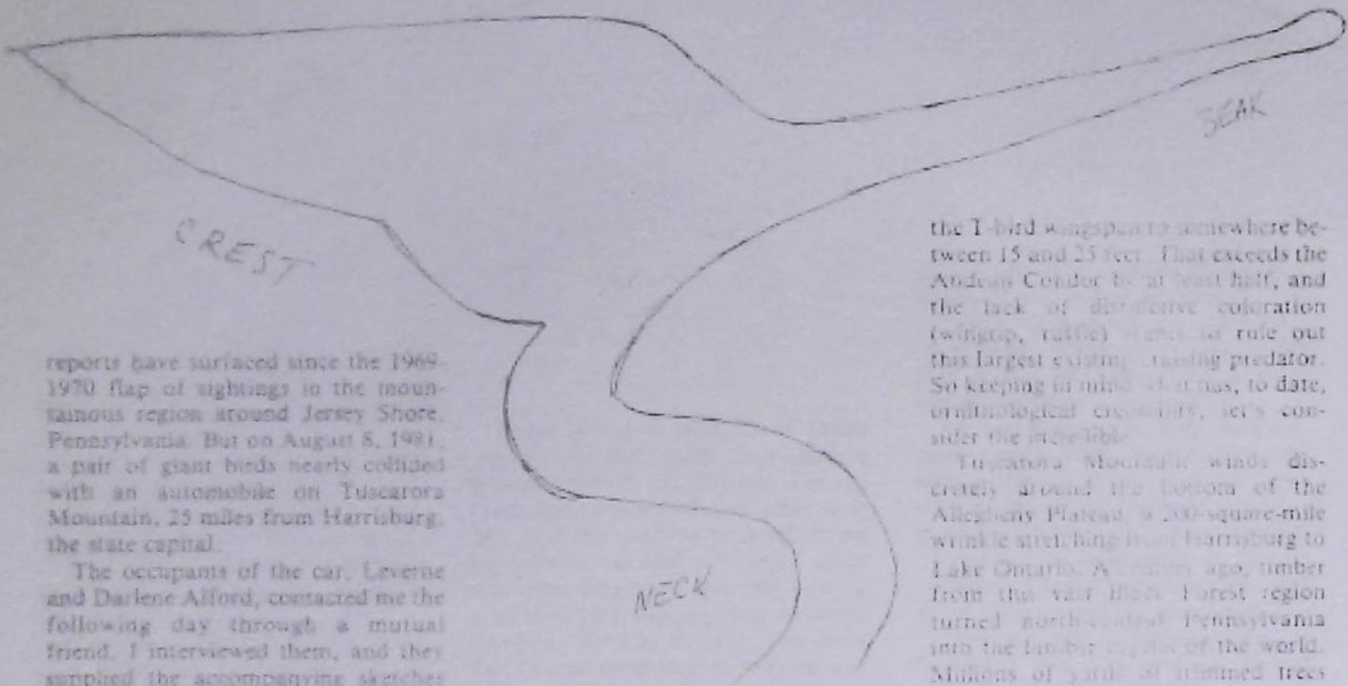
The Tuscarora Mountain T-Birds

by Carl Larsen

Strictly speaking, birds like these could not exist in north-central Pennsylvania or elsewhere on this planet in this day and age. But the witnesses do not doubt what they saw, and their answer to the skeptics is a smile and just two words: "They're here!"

THUNDERBIRDS HAVE SOARED through Pennsylvania folklore for more than a hundred years, and there is some recent evidence for the possibility that the legendary big birds have not yet flown the coop.

Although rural rumor (e.g., "Hey, my cousin knows a guy who had a friend who saw one!") in north-central Pennsylvania would place the Thunderbird population equal to that of the American Cow, few eyewitness reports have surfaced since the 1969-1970 flap of sightings in the mountainous region around Jersey Shore, Pennsylvania. But on August 8, 1981, a pair of giant birds nearly collided with an automobile on Tuscarora Mountain, 25 miles from Harrisburg, the state capital.



The occupants of the car, Leverne and Darlene Alford, contacted me the following day through a mutual friend. I interviewed them, and they supplied the accompanying sketches and, later, a letter confirming some of the details of their sighting.

The Alfords seemed to be sane, middle-class, responsible people, both in their early thirties. Leverne works as a counselor at a youth development center, and Darlene is a housewife and former counselor at the same agency. Their close encounter—they came within two yards of a collision—with a pair of unidentifiable and oversized flying creatures left them understandably curious. Few birds of flight leave one with the impression that they were "awesome" or "overwhelming."

For some basic background and/or speculation on Thunderbirds, see *Pursuit*, Vol. 5, No. 2; Vol. 8, No. 2; and Vol. 9, No. 2. As noted therein, the late Robert R. Lyman gathered dozens of published sightings dating back as far as 1845. His pair of books, *Forbidden Land* and *Amazing Indeed*, cover a multitude of Pennsylvania anomalies and are still available from The Potter Enterprise, Coudersport, Pa. Other references are published in the Corliss Sourcebook entitled *Strange Life*.

Legends of the Pacific Northwest Amerindians tell of Thunderbirds plucking whales from the sea and depositing scarred carcasses in the treetops. Sliding across the ages from totem to Tuscarora is easy enough for those of us who delight in possibilities but remain skeptical. (See Jung, see Fort, see the St. Louis Cardinals going en masse from first to third in the last World Series.) Estimated bird dimensions increased with time, then began to shrink with the advent of handy, measurable environmental yardsticks like roads and shadows thereon.

From interviews with witnesses in three separate cases, we can narrow the T-bird wingspan to somewhere between 15 and 25 feet. That exceeds the Andean Condor by at least half, and the lack of distinctive coloration (wingtip, ruffle) seems to rule out this largest existing soaring predator. So keeping in mind what has, to date, ornithological credibility, let's consider the incredible.

Tuscarora Mountain winds discretely around the bottom of the Allegheny Plateau, a 200-square-mile wrinkle stretching from Harrisburg to Lake Ontario. A century ago, timber from the vast Black Forest region turned north-central Pennsylvania into the lumber capital of the world. Millions of yards of trimmed trees toppled yearly and clattered down sluices into the Susquehanna River, to be gathered and rafted at the locks. Eventually, the industry moved on to more accessible woodlands. Left were three million square acres of forest that even now are sparsely populated and have enough room between the bordering mountains to provide a sanctuary for even the largest of feathered friends.

On August 8, 1981, Leverne and Darlene Alford left their home in Carlisle, Pa. Their destination was Lock Haven, 72 miles to the north, where they would visit the home of a well-respected local lawyer (the "mutual friend" who brought about our contact).

[illegible] [illegible] Mountain and Limestone Ridge before it crosses Tuscarora Mountain. An early morning fog had drifted into the valleys but it began to clear as the Alfords ascended and neared the town of Ickesburg.

At approximately 9:00 a.m., they approached a large pile of rocks by the side of the road, known locally as a favorite sunning place for rattlesnakes. Leverne suddenly veered the car as he took sight of two giant birds scrambling for safety, urged on by the threatening noisy approach of a steel-clad monster. Like planes on the deck of some nightmarish aircraft carrier, the birds lumbered down the highway in front of the car, gaining speed for a takeoff. Six feet before the point of collision, the nearer bird began to pull away.

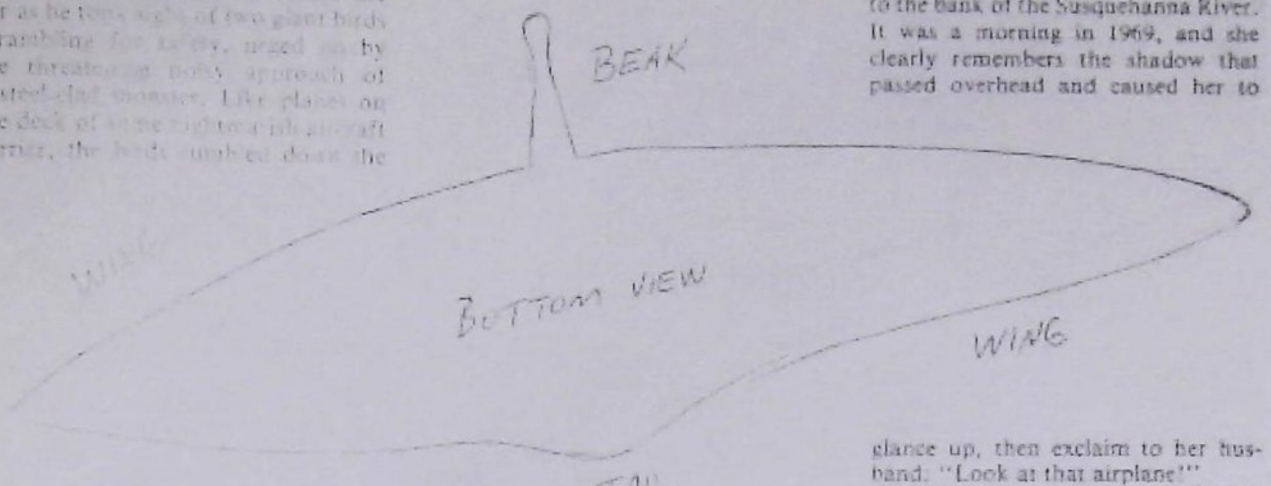
During an interview the following day, Leverne estimated that the birds stood three feet from tail to beak, and that their wingspan covered the entire 15-foot width of the highway lane. But it wasn't size that impressed him the most.

"They didn't seem to have any feathers," he said. "They looked like they were covered with skin. I immediately thought of those prehistoric birds."

"They were both about the same size," he recalled, "with long necks curved in an S shape. They were dark gray in color, with rounded beaks."

As the strange birds rose and flew directly above the highway, the Alfords followed for half a mile and Darlene was able to observe them in full-flight configuration from the passenger side of the car. She later drew the "bottom view" sketch and inked-in Leverne's penciled profile. The birds were in view for about fifteen minutes before they had gained enough altitude to disappear from sight. The Alfords retained no impressions of eyes or feet on the two creatures.

The sincerity of the two reporters was as convincing as all other aspects of the unusual sighting. They had, and have, nothing to prove or gain from it. Discussions with other bird-sighters, although based on encounters that had taken place in the 1969-70 flap, only confirmed or added definition to the Alfords' story.



In the spring of 1970, Susan Dolan was driving the family Jeep along a wooded stretch of Clinton County road. The time was shortly after midday, and the sun was peaking. From the trees to her left, a "thing" arose and seemed to hover over the moving vehicle before disappearing over the treetops. She was startled. The thing had caused considerable swaying and commotion among the trees.

Mrs. Dolan, a graduate of the University of Michigan and an outdoors enthusiast, stated: "It was huge. It blotted out the sun. The shadow covered the road from side to side." The paved portion of the road, as measured, is 25 feet wide.

"My husband and I have hiked all through these mountains, and I have identified birds from robins to eagles. But we've never seen anything like this," she said.

Familiar with the local Thunderbird tradition, Mrs. Dolan related the story to her family when she got home—with predictable results.

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Another survivor of the decade-old flap is Anna Mincer, who earned the monicker "Bird Lady" by publicly admitting that she saw what she saw. In a telephone interview, she recalled her first Thunderbird sighting.

She and her late husband were in their back yard, which reaches down to the bank of the Susquehanna River. It was a morning in 1969, and she clearly remembers the shadow that passed overhead and caused her to glance up, then exclaim to her husband: "Look at that airplane!"

"Hell, that ain't no airplane," he replied. Whatever it was in the sky, it was the size of an airplane but as soundless as a cloud.

"It was mammoth. Very dark colored, nearly black. And it flew low enough for us to see that the claws were as big as my husband's hand—and he was a big man." Anna paused. "It seemed to soar along on the air currents. Then it would circle, and move back toward the mountains."

They saw what looked like the same bird later that day, and on several occasions the following year.

Awesome? Huge? Mammoth? Perhaps the Black Forest of Pennsylvania harbors a Loch Nessian nest of Pteranodons. Out of circulation a mere 65 million years, those leathery winged prototypes of the hang glider had a counterbalancing crest on the head that matches the Alford sketch, and were of comparable size.

Whatever the cause, whatever the nature of these oddities, all eyewitnesses agreed: On separate occasions, they saw something remarkably large. They saw something that flies in the manner of a bird. They saw something they could not identify.

Courtesy: Gary Mangiacopra

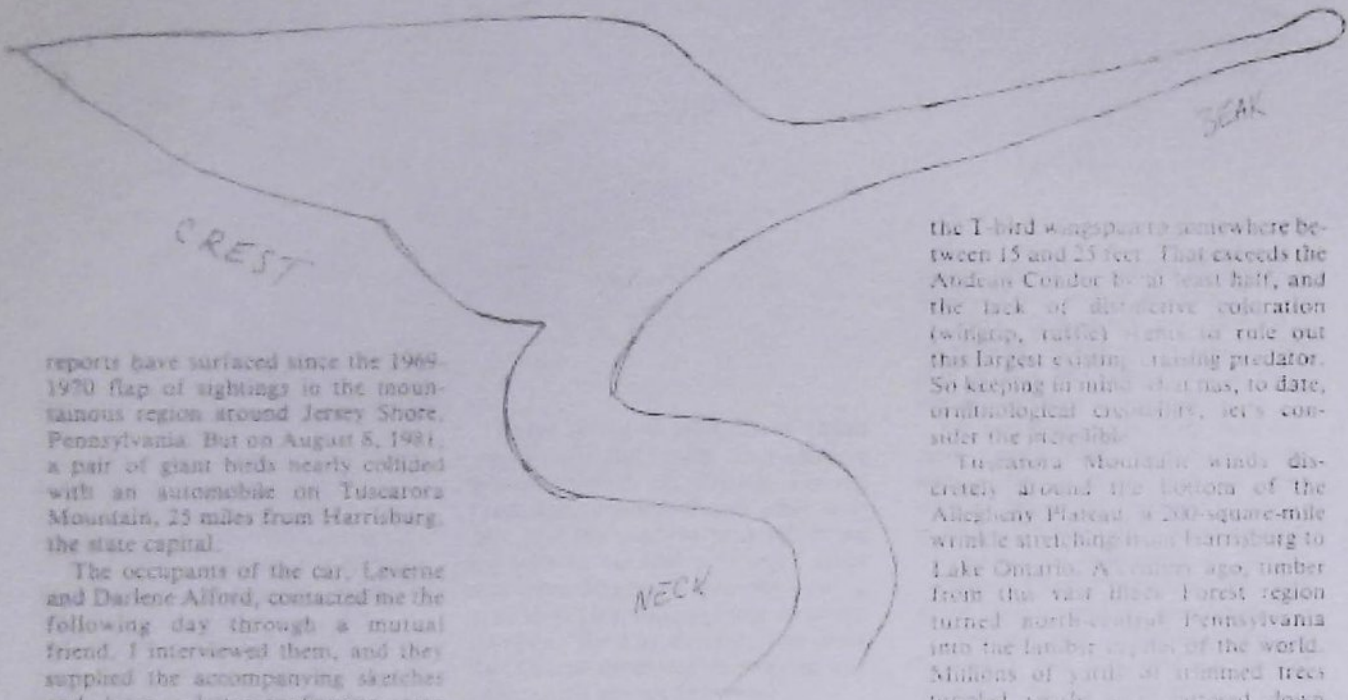
The Tuscarora Mountain T-Birds

by Carl Larsen

Strictly speaking, birds like these could not exist in north-central Pennsylvania or elsewhere on this planet in this day and age. But the witnesses do not doubt what they saw, and their answer to the skeptics is a smile and just two words: "They're here!"

THUNDERBIRDS HAVE SOARED through Pennsylvania folklore for more than a hundred years, and there is some recent evidence for the possibility that the legendary big birds have not yet flown the coop.

Although rural rumor (e.g., "Hey, my cousin knows a guy who had a friend who saw one!") in north-central Pennsylvania would place the Thunderbird population equal to that of the American Cow, few eyewitness reports have surfaced since the 1969-1970 flap of sightings in the mountainous region around Jersey Shore, Pennsylvania. But on August 8, 1981, a pair of giant birds nearly collided with an automobile on Tuscarora Mountain, 25 miles from Harrisburg, the state capital.



The occupants of the car, Leverne and Darlene Alford, contacted me the following day through a mutual friend. I interviewed them, and they supplied the accompanying sketches and, later, a letter confirming some of the details of their sighting.

The Alfords seemed to be sane, middle-class, responsible people, both in their early thirties. Leverne works as a counselor at a youth development center, and Darlene is a housewife and former counselor at the same agency. Their close encounter—they came within two yards of a collision—with a pair of unidentifiable and oversized flying creatures left them understandably curious. Few birds of flight leave one with the impression that they were "awesome" or "overwhelming."

For some basic background and/or speculation on Thunderbirds, see *Pursuit*, Vol. 5, No. 2; Vol. 8, No. 2; and Vol. 9, No. 2. As noted therein, the late Robert R. Lyman gathered dozens of published sightings dating back as far as 1845. His pair of books, *Forbidden Land* and *Amazing Indeed*, cover a multitude of Pennsylvania anomalies and are still available from The Potter Enterprise, Coudersport, Pa. Other references are published in the Corliss Sourcebook entitled *Strange Life*.

Legends of the Pacific Northwest Amerindians tell of Thunderbirds plucking whales from the sea and depositing scarred carcasses in the treetops. Sliding across the ages from totem to Tuscarora is easy enough for those of us who delight in possibilities but remain skeptical. (See Jung, see Fort, see the St. Louis Cardinals going en mass from first to third in the last World Series.) Estimated bird dimensions increased with time, then began to shrink with the advent of handy, measurable environmental yardsticks like roads and shadows thereon.

From interviews with witnesses in three separate cases, we can narrow the T-bird wingspan to somewhere between 15 and 25 feet. That exceeds the Andean Condor by at least half, and the lack of distinctive coloration (wingtip, ruffle) seems to rule out this largest existing [illegible] predator. So keeping in mind what has, to date, ornithological credibility, let's consider the incredible.

Tuscarora Mountain winds discretely around the bottom of the Allegheny Plateau, a 200-square-mile wrinkle stretching from Harrisburg to Lake Ontario. A century ago, timber from the vast Black Forest region turned north-central Pennsylvania into the lumber capital of the world. Millions of yards of trimmed trees toppled yearly and clattered down sluices into the Susquehanna River, to be gathered and [illegible] at the locks. Eventually, the industry moved on to more accessible woodlands. Left were three million square acres of forest that even now are sparsely populated and have enough room between the bordering mountains to provide a sanctuary for even the shyest of feathered friends.

On August 8, 1981, Leverne and Darlene Alford left their home in Carlisle, Pa. Their destination was Lock Haven, 72 miles to the north, where they would visit the home of a well-respected local lawyer (the "mutual friend" who brought about our contact).

[illegible] were [illegible] Mountain and Limestone Ridge before it crosses [illegible] Mountain. An early morning fog had drifted into the valleys but it began to clear as the Alfords ascended and neared the town of [illegible].

At approximately 9:00 a.m. they approached a large pile of rocks by the side of the road, known locally as a favorite sunning place for rattlesnakes. Leverne suddenly veered the car as he took sight of two giant birds scrambling for safety, urged on by the threatening noisy approach of a steel-clad monster. Like planes on the deck of some nightmarish aircraft carrier, the birds lumbered down the highway in front of the car, gaining speed for a takeoff. Six feet before the point of collision, the nearer bird began to pull away.

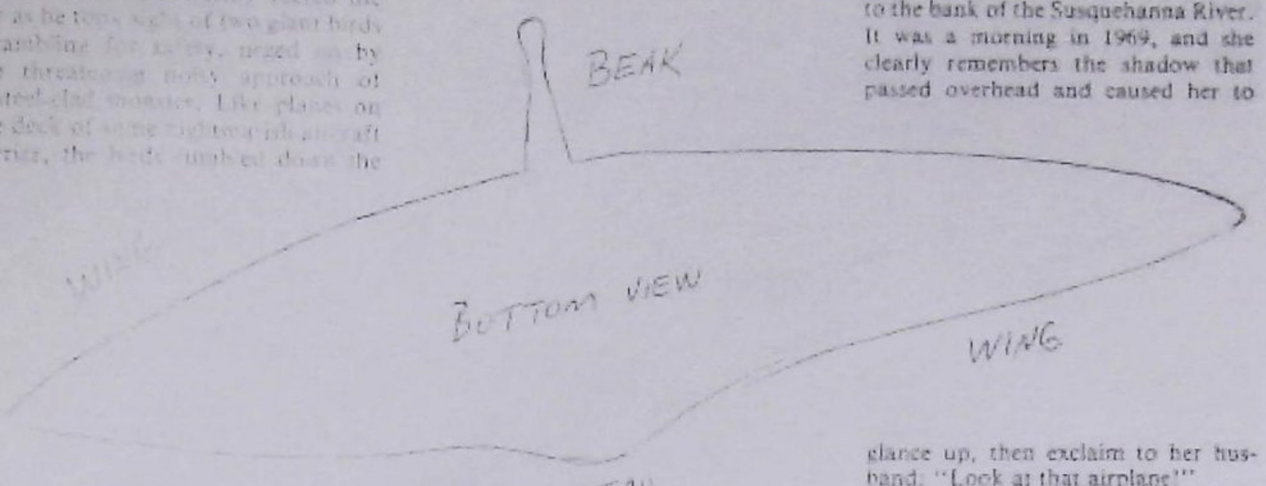
During an interview the following day, Leverne estimated that the birds stood three feet from tail to beak, and that their wingspan covered the entire 15-foot width of the highway lane. But it wasn't size that impressed him the most.

"They didn't seem to have any feathers," he said. "They looked like they were covered with skin. I immediately thought of those prehistoric birds."

"They were both about the same size," he recalled, "with long necks curved in an S shape. They were dark gray in color, with rounded beaks."

As the strange birds rose and flew directly above the highway, the Alfords followed for half a mile and Darlene was able to observe them in full-flight configuration from the passenger side of the car. She later drew the "bottom view" sketch and inked-in Leverne's penciled profile. The birds were in view for about fifteen minutes before they had gained enough altitude to disappear from sight. The Alfords retained no impressions of eyes or feet on the two beasties.

The sincerity of the two reporters was as convincing as all other aspects of the unusual sighting. They had, and have, nothing to prove or gain from it. Discussions with other birdsighters, although based on encounters that had taken place in the 1969-70 flap, only confirmed or added definition to the Alfords' story.



In the spring of 1970, Susan Dolan was driving the family Jeep along a wooded stretch of Clinton County road. The time was shortly after midday, and the sun was peaking. From the trees to her left, a "thing" arose and seemed to hover over the moving vehicle before disappearing over the treetops. She was startled. The thing had caused considerable swaying and commotion among the trees.

Mrs. Dolan, a graduate of the University of Michigan and an outdoors enthusiast, stated: "It was huge. It blotted out the sun. The shadow covered the road from side to side." The paved portion of the road, as measured, is 25 feet wide.

"My husband and I have hiked all through these mountains, and I have identified birds from robins to eagles. But we've never seen anything like this," she said.

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Does nomenclatural availability of nomina of new species or subspecies require the deposition of vouchers in collections?

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Abstract

Several species of birds and primates recently described opened a debate in the zoological community on the possibility of naming new species or subspecies without material onomatophores ("name-bearing types") deposited in collections. The current writing of the *Code* is ambiguous in this respect. We support here the view that such practice is not doing a service to the discipline of taxonomy as illustrations, DNA sequences or "definitions" cannot replace voucher specimens. The latter are and will be badly needed for the proper knowledge of the vanishing biodiversity of our planet. We review arguments pro and con the need to have a Rule in the *Code* requiring the deposition of onomatophores in collections for the proper and valid creation of new nomina in zoological nomenclature. In conclusion, we propose a more drastic Rule in this respect but also the possibility, in some exceptional cases, to apply to the International Commission on Zoological Nomenclature to make nomina available even in the absence of material onomatophores.

Key words: Biodiversity crisis — Nomenclatural availability — Vouchers — Onomatophores — Collections — Illustrations — DNA sequences — Definitions — *Code* — Commission

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Introduction

This paper discusses an important question of zoological nomenclature at the verge of the "century of extinctions" (Dubois 2003): that of the *nomenclatural availability* and consequently *validity* of zoological scientific names or *nomina* (Dubois 2000) published without *onomatophores* ("type-specimens"; see Dubois 2000, 2005) deposited in a collection. This problem has been raised recently for several species of vertebrates considered "rare and endangered". It is only one avatar of a new tendency in taxonomy, consisting in the description and naming of new taxa without voucher specimens, e.g., based only on molecular evidence, even when no threat on the taxon is currently identified, or of taxa "defined" through "phylogenetic definitions" but without vouchers or even diagnostic characters. Such problems may become more and more common if the strict and clear Rules of the *International Code of Zoological Nomenclature* (Anonymous, 1999; "the *Code*" hereafter) regarding nomen availability are not understood and adopted by all zoologists and scientific editors.

As it develops, the biodiversity crisis — mainly caused by anthropogenic factors — will more and more face zoologists with the ethical dilemma of sacrificing specimens potentially important for the survivorship of their species in order to satisfy the minimum criteria established by the *Code* to make a new nomen available. This situation already exists but will tend to become more frequent in the forthcoming years, as extinctions will go on and as new taxa — especially of vertebrates — will be discovered in isolated refuges, with small relict populations and therefore highly threatened with extinction. Whereas some taxonomists aim to rely on scientific objectivity and precision through the deposition of fixed reference specimens (onomatophores) in public collections, some are also tempted to skip this procedure to give new discovered species with tiny populations a better chance of surviving. However, the *Code* does not provide special conditions for describing "endangered" species, and its Rules for the nomenclatural availability of nomina must be followed if the latter are to be used validly to designate zoological taxa.

This problem concerning onomatophores is but one special example of a more general trend in recent scientific literature dealing with systematics, phylogeny and evolutionary biology, where the important role of vouchers is underestimated, if not ignored or denied (Funk *et al.* 2005). This is illustrated by the fact that some major databases such as Genbank do not require the indication of voucher specimens associated with the information they store (molecular sequences in the case of Genbank). The case of the classical cytological studies in botany reminded by Funk *et al.* (2005: 127) is exemplary of what could be the fate of some of the data in Genbank and other databases: "the absence of vouchers for literally thousands of early chromosome counts — a majority of all counts made prior to 1965 — has rendered those data essentually worthless: the identity of the plants cannot be verified. The enormous effort made by those early cytologists comes to little or nothing at all."

No rules oblige taxonomists to deposit vouchers when they describe a new species, simply because there is no "code of taxonomy" — for reasons detailed by Dubois (2005). However, as soon as not only describing, but also naming is involved — a distinct process, which belongs in nomenclature, not in taxonomy proper —, vouchers are necessary. Although the nomenclatural role of these special vouchers is particular (to provide an objective standard for the allocation of nomina to taxa; see below), these specimens have also "incidentally" an important taxonomic function, that of providing material references for the characters described by taxonomists. Because of this secondary, taxonomic, function of onomatophores, the *Code* so to speak fills a deficiency caused by the absence of a code of taxonomy. Onomatophores are indeed very important vouchers for the whole of evolutionary biology, and museums and other collections caring for their preservation in good conditions play a major role in our understanding of biodiversity.

In the recent years, several zoological species were described as new without deposition of reference specimens in collections, because these species were considered by their discoverers too endangered to allow collection of even a single specimen without increasing their risk of extinction. Examples include the bird *Laniarius liberatus* (Smith *et al.* 1991) and several primates: the mangabey *Lophocebus kipunji* (Jones *et al.*

2005), later made the type of a new genus (Davenport *et al.* 2006); the lemur *Avahi cleesei* (Thalmann & Geissmann 2005); and the capuchin *Cebus queirozi* (Mendes Pontes *et al.* 2006). These cases have been in the center of a contentious debate on the need for keeping dead specimen holotypes for establishing the nomina of new animal species. Whereas some authors (Timm *et al.* 2005, Landry 2005, Oliveira & Langguth 2006) stated that the nomina of these taxa, if published after 1999, are nomenclaturally unavailable, others (Wakeham-Dawson *et al.* 2002, Polaszek *et al.* 2005) defended the opposite idea. Similar situations, although in these cases not caused by threats on the species but on "rarity" of species and difficulties in collecting them, were recently encountered in several cases of descriptions of new species based on DNA sequences only, without onomatophores, for example in whales (Dalebout *et al.* 2004, and references therein), and these cases were also taken as flag examples for a plea for "modern" nomenclature that could supposedly be "freed" from the constraint of depositing dead specimens in collections (Dalebout & Baker 2002): "Due to the declining abundance of many species, access to complete anatomical specimens is becoming a vanishing luxury. (…) For many animal taxa, the lethal collection of such voucher specimens would now also be considered unethical." (Dalebout *et al.* 2004: 459).

Interestingly, this new trend meets another recent one in biological nomenclature, illustrated by the promoters of nomenclatural systems alternative to the current codes, where allocation of nomina to taxa is not based on onomatophores but on so-called "phylogenetic definitions". As discussed in detail elsewhere (Dubois 2005, 2006b), a basic problem (among others) of such nomenclatural systems is that they miss the material connexion between language and specimens realized by onomatophores.

Our aim in this paper is to explore again this question in the light of the current *Code* and of other considerations.

Nomenclatural availability of nomina

Dubois (2005) distinguished three steps in the nomenclatural process required to establish the valid nomen of a taxon in zoology under the Rules of the *Code*: *availability* of nomen (through publication and respect of precise criteria), *allocation* of nomen to taxon (through onomatophore) and *validity* of nomen (through priority). These three "floors of the nomenclatural house" must be explored successively. Regarding the first floor, availability, Dubois (2000) recognized two categories of nomina: ***hoplonyms*** are nomina published through respect of all *Code*'s criteria of nomen availability, whereas ***anoplonyms*** are nomina published but not respecting all these criteria, and therefore nomenclaturally unavailable (i.e., "non-existent" in zoological nomenclature). Criteria of availability are mostly described in Chapter 4 (Articles 10 to 20) of the *Code*, but also in Chapter 1 (Articles 1 to 3) of the latter. The term ***nomen nudum*** (***gymnonym*** in Dubois 2000) designates only a subcategory of the category of anoplonym, as the "Glossary" of the *Code* (p. 111) defines it as a nomen "that, if published before 1931, fails to conform to Article 12; or, if published after 1930, fails to conform to Article 13". To be an anoplonym, a nomen just has to fail to conform to any of the Articles 1–3 and 10–20, so this covers a much wider array of cases than the category of ***nomen nudum***.

It is important to realize that the Rules for nomen availability have changed through time, and these Rules nowadays are much more stringent than in the past. Today, practising taxonomists are following these Rules, not those of the past. Importantly, Article 16 is new, and it introduces important changes compared to the previous edition of the *Code* (Anonymous 1985). Let us review the Rules of the *Code* regarding nomen availability.

Chapter 1 ("Zoological nomenclature") provides general Rules for admissibility of nomina covered by the *Code*: nomina failing to conform these Rules are therefore anoplonyms. Article 1.1 states that zoological nomenclature only covers nomina applied to taxa of extant or extinct animals, which excludes oganisms referred to other kingdoms. Article 1.3 expressly excludes from zoological nomenclature several categories of nomina, in particular proposed "for hypothetical concepts" (Art. 1.3.1) or "after 1930, for the work of extant animals" (Art. 1.3.6). The "Glossary" of the *Code* (p. 101) defines "hypothetical concept" as follows: "A taxonomic concept that when published contained no animal then known to exist in nature, past or present, but only in the mind of the author whether a prediction or not". This sentence is strangely written, as a concept cannot "contain" an animal, but "refer to" or "designate" it. The French version of the "Glossaire" (p. 235) proposes a more accurate definition of "concept hypothétique", as it mentions that such a concept "n'est pas basé sur un animal (...)" ("is not based on an animal"). Article 3 excludes from zoological nomenclature all nomina and nomenclatural acts published before 1758.

Chapter 4 ("Criteria of availability") lists all criteria which must be met for a nomen to be available in zoological nomenclature. For the purpose of the present discussion, we will briefly survey most of these conditions and only outline a few of them. Articles 10 and 11 present general conditions of availability, in particular regarding the need of publication and the formation of nomina. Article 12 presents special requirements that only apply to nomina published before 1931: any such nomen "must be accompanied by a description or a definition of the taxon that it denotes, or by an indication" (Art. 12.1), and Art. 12.2 defines precisely the meaning of the term "indication". Article 13 concerns nomina published after 1930, and requires that they "be accompanied by a description or definition that states in words characters that are purported to differentiate the taxon", or refers to such a published statement, or be proposed as a *nomen novum* (*neonym* in Dubois 2000) for an already available nomen. Article 14 excludes from zoological nomenclature nomina published anonymously before 1950, and Article 15 excludes nomina published conditionally, or for taxa given the ranks "variety" or "form", after 1960. Articles 17 to 20 provide special Rules concerning availability of nomina in a few particular situations (e.g., nomina applied to taxa of hybrid origin, tautonymous nomina or subsequent spellings of nomina).

All the preceding articles existed, in similar or slightly different forms, in the past editions of the *Code* until the so-called third one (Anonymous 1985), and none of them mentioned the need, for availability of nomina, of the existence of an onomatophore (holotype, syntypes, lectotype or neotype). However, an important change was brought to the *Code* in Article 16 of the fourth edition (Anonymous 1999), which added several requirements for availability of nomina published after 1999. These new requirements include the need of an explicit statement of the intention to establish a new nominal taxon, the need to mention the type genus of a new familial nomen, and, above all, the need of fixation of the onomatophore for any new specific or subspecific nomen. As this part of Article 16 will be in the center of the discussion below, it is better to provide a large quote of it, including some of its Recommendations:

"16.2. **Family-group names: type genus to be cited.** (...) a new family-group name published after 1999 must be accompanied by citation of the name of the type genus (...).

16.4 **Species-group names: fixation of name-bearing types to be explicit.** Every new specific and subspecific name published after 1999, except a new replacement name (a nomen novum), for which the name-bearing type of the nominal taxon it denotes is fixed automatically (...), must be accompanied in the original publication

16.4.1. by the explicit fixation of a holotype, or syntypes, for the nominal taxon (...), and,

16.4.2 where the holotype or syntypes are extant specimens, by a statement of intent that they will be (or are) deposited in a collection and a statement indicating the name and location of that collection (see Recommendation 16C).

Recommendation 16C. Preservation and deposition of type specimens. Recognizing that name-bearing types are international standards of reference (see Article 72.10) authors should deposit type specimens in an institution that maintains a research collection, with proper facilities for preserving them and making them accessible for study (i.e. one which meets the criteria in Recommendation 72F).

Recommendation 16D. Publication of information distinguishing type specimens. When providing information to distinguish the type specimen(s) from other specimens (Article 16.4.1) authors should include information such as specimen numbers and descriptions of labels (see Recommendations 73C and 73D for data recommended).

Recommendation 16E. Preference for holotype over syntypes. Whenever possible, authors should select a holotype rather than syntypes.

Recommendation 16F. Illustrations of type specimens. Whenever possible a holotype or syntypes should be illustrated, showing characteristic features of the taxon, in the work in which the new nominal taxon is established."

Also relevant for this discussion are the following Articles:

"72.2. **Fixation of name-bearing types from type series of nominal species-group taxa established before 2000.** A nominal species-group taxon established before 2000 may have its name-bearing type fixed from the type series (...) originally (...), or subsequently (...). (If no name-bearing type is believed to be extant a neotype may be fixed; see Article 75 for conditions).

72.3. **Name-bearing types must be fixed originally for nominal species-group taxa established after 1999.** A proposal of a new species-group taxon after 1999 (unless denoted by a new replacement name (nomen novum) (…), must include the fixation of a holotype (...) or syntypes (...). In the case of syntypes, only those specimens expressly indicated by the author to be those upon which the new taxon was based are fixed as syntypes.

(...)

72.5. **Eligibility as name-bearing types.** Only the following are eligible to be a name-bearing type, or part of a name-bearing type, or a nominal species-group taxon:

72.5.1. an animal, or any part of an animal, (...);

72.5.6. In the case if a nominal species-group taxon based on an illustration or description, or on a bibliographic reference to an illustration or description, the name-bearing type is the specimen or the specimens illustrated or described (and not the illustration or description itself).

(...)

72.10. **Value of name-bearing types.** Holotypes, syntypes, lectotypes and neotypes are the bearers of the scientific names of all nominal species-group taxa (and indirectly of all animal taxa). They are the international standards of reference that provide objectivity in zoological nomenclature and must be cared for as such (...). They are to be held in trust for science by the persons responsible for their sage keeping.

Recommendation 72D. Labelling of name-bearing types. Holotypes, syntypes, lectotypes and neotypes should be labelled in a way that will unmistakably denote their status.

Recommendation 72E. Publication of information on labels. An author who designates a holotype, lectotype, neotype or syntypes should publish all information that appears on the labels accompanying the specimens so as to facilitate the future recognition of the specimens.

Recommendation 72F. Institutional responsibility. Every institution in which name-bearing types are deposited should

72F.1 ensure that all are clearly marked so that they will be unmistakably recognized as name-bearing types;

72F.2 take all necessary steps for their safe preservation;

72F.3 make them accessible for study;

72F.4 publish lists of name-bearing types in its possession or custody; and

72F.5 so far as possible, communicate information concerning name-bearing types when requested.

(...)

73.1. **Holotypes.** A holotype is the single specimen upon which a new nominal species-group taxon is based in the original publication (...).

73.1.1. If an author when establishing a new nominal species-group taxon states in the original publication that one specimen, and only one, is the holotype, or 'the type', or uses some equivalent expression, that specimen is the holotype fixed by original designation. (...)

73.1.4. Designation of an illustration of a single specimen as a holotype is to be treated as designation of the specimen illustrated; the fact that the specimen no longer exists or cannot be traced does not of itself invalidate the designation. (...)

Recommendation 73C. Data on the holotype. An author who establishes a new nominal species-group taxon should publish at least the following data concerning the holotype, if they are relevant and known to the author: (...)

73C.6 the collection in which it is situated and any collection number or register number assigned to it; (...)"

Changes in the *Code* regarding the nomenclatural function of onomatophores

Before discussing the problem addressed by the papers mentioned above, it is useful to clarify the nomenclatural function of onomatophores ("name-bearing types"). One often reads that these specimens "provide objectivity in zoological nomenclature" (e.g., Art. 72.10 of the *Code* quoted above). This is true, but needs more precise qualification. The function of these specimens is not, as some have construed it (e.g., de Queiroz & Gauthier 1990, 1994; Pennisi 2001; Joyce *et al.* 2004; Sluys *et al.* 2004), to provide *characters* that would allow to *define* the taxon to which the nomen is applied: this would rely on a typological conception of taxonomy which is outdated and that few recent taxonomists would support (Dubois 2005). The definition of taxa is not a matter of nomenclature but a matter of taxonomy, and the *Code* does not deal with taxonomy but with nomenclature. The *Code* does not provide rules or guidelines for defining taxa, but Rules for naming taxa once they have been defined. To avoid such basic confusion, extirpation of the term "type" of its derivatives from the vocabulary of nomenclature would be useful (Dubois 2005) and this is why we here use the term *onomatophore* (Simpson 1940) for "name-bearing type" in the *Code*.

The main role of onomatophores under the *Code* is to provide an objective connexion between the world of specimens (and, through them, of natural populations of organisms) and the world of language (Dubois & Ohler 1997a–b). It allows allocation of a nomen to a taxon or several taxa. A given nomen applies potentially to any taxon that includes its onomatophore — in fact, it only applies to a single taxon or a few taxa, because of the existence of several nominal-series and of the Rule of Coordination (for details see Dubois 2006b and submitted-a) — and that is all. This function of onomatophore (bearing the nomen) pertains in the second floor of the nomenclatural house (nomen allocation) and has nothing to do with availability of nomen. Until 1999, no Rule existed requiring the designation of an onomatophore for availability of a nomen, and Rules allowed subsequent fixation of onomatophores for nominal-taxa first created without onomatophores (at least in the species and genus nominal-series). The 1999 edition of the *Code* introduced a new function for onomatophores, in requiring their designation for a nomen to become available. This is an important change, highly welcomed by taxonomists (see below), but which does not imply that onomatophores, as such, are used to provide the characters of the taxa denoted by the nomina. "As such" means that, beside their nomenclatural function of onomatophores, the same specimens, which are part of what the *Code* calls the series of "type specimens", but which is better designated as the *hypodigm* (Simpson 1940, Dubois 2006a), also have a taxonomic function, which is to provide characters that will be used to build up a taxonomy (nowadays often through the formulation of a phylogenetic hypothesis).

In the 1985 *Code*, explicit designation of an onomatophore was compulsory for nomen availability only for nomina of the genus-series, as Article 13.b required that such a nomen created after 1930 "be accompanied by the fixation of a type species". The 1999 *Code* is much more consistent in this respect, as its Article 16.2 requires that new family-series nomina created after 1999 "be accompanied by citation of the name of the type genus", and its Article 16.4 provides a similar Rule for species-series nomina (see below). Such Rules are nd most welcome, because they clearly point to the Principle of Onomatophores as the basic prin- for allocation of nomina to taxa in the *Code*. This is a major difference with other nomenclatural systems those supported by proponents of various systems of "phylogenetic nomenclature", and this is the main reason why both kinds of nomenclatural systems are incompatible and cannot be "reconciled" or "mixed" as suggested by some (e.g., Kuntner & Agnarsson 2006). This is also the major reason for superiority of the *Code* over these alternative systems, as it maintains a permanent link between specimens and nomina and is therefore not an internal system within language, and as it allows nomenclature to remain theory-free regarding taxonomy, and therefore liable to adapt to new taxonomic paradigms that might develop in the future (Dubois 2005 and submitted-a).

For the availability of nomina, the last edition of the *Code* now requires "fixation" of onomatophores. "Fixation" means that, to be available, a new nomen must have been created *associated with the fixation or designation* of a holotype or syntypes. By itself, this statement simply requires this *designation*, but not clearly that the onomatophore be *preserved* after designation and description, as will be discussed below.

Why was this important change brought to the *Code*? No explanation was provided in this respect in the "Introduction" of this edition (Ride 1999), although this text spent space tackling other minor questions or points that were not yet in order at the time of its publication (such as the eventuality of "replacing 'publication' as a primary determinant of availability", a very questionable idea indeed). We can see two immediate reasons for supporting this major change: (1) requiring the designation of onomatophores avoids the introduction into nomenclature of nomina based on "hypothetical concepts", as defined above; (2) it avoids the creation of "phantom nomina", as defined by Vences *et al.* (1999). These points will be further clarified and discussed below, but it should be clear already that, if these two reasons are indeed behind the change in this article of the *Code*, simple consistency would require that onomatophores be not only designated but also preserved, as otherwise none of these two problems would be solved.

As a matter if fact, there is an apparent contradiction between Articles 16.4.1 and 16.4.2 of the new *Code*. Article 16.4.1 requires the *explicit fixation* of an onomatophore for any new species-series nomen to be available. A common sense interpretation of this Rule is that this fixation of the onomatophore must always be followed by its deposition in a public collection, all the more that Article 72.10 states that such specimens are "international standards of reference" that "are to be held in trust for science". This would mean that nomina created on the basis of an illustration, without real specimen, would be anoplonyms if published after 1999. However, this interpretation is not straightforward. Article 16.4.2 starts with the words "where the holotype or syntypes are extant specimens" — which means that they may *not* be extant specimens, and therefore may *not* be deposited in a collection. Polaszek *et al.* (2005: 2165) recognized that the current wording of Article 16 of the *Code* is ambiguous and should be made clearer, since they wrote: "The well-intentioned reactions of Landry and Timm et al. show that the current Code is open to different interpretations on the subject of type specimens". What can be these "different interpretations"?

According e.g. to the *Oxford Dictionary* (Thompson 1995: 476) "extant" means "still existing", and the "Glossary" of the *Code* (p. 104) also defines it as "still in existence". The first part of Art. 16.4.2 thus suggests that the holotype or syntypes may not be still in existence without impeding nomenclatural availability. There seems to be three possible reasons why it could not be the case: (R1) the specimen was examined by the describer, then killed, fixed and deposited in a collection, but later destroyed, lost or misplaced, so that it had disappeared at the time of publishing the description; (R2) it was examined alive by the describer, but then escaped or was set free before publication of the description; (R3) it was described only from indirect evidence (drawing, photograph, description, traces, etc.), but it has never been in the hands of the describer. The first case (R1) must be extremely rare in the case of nomina created after 1999, as it is unlikely that a specimen was killed, deposited in a collection, and destroyed or lost just after, before publication of the description, in a period of a few years. In contrast, both the second and third possibilities may apply to nomina created after 1999 and covered by Article 16.4.2 if the current *Code*.

Polaszek *et al.* (2005) and others interpreted this article as meaning that a species can be named without depositing an onomatophore in a collection. This interpretation (I1) is supported by Article 73.1.4, which states that, even after 1999 (as no mention of a limiting date is made in this article), an illustration may be designated as onomatophore of a new taxon, and that "the fact that the specimen no longer exists or cannot be traced does not of itself invalidate the designation". With this interpretation, the mention of the possibility to create a new nomen without "extant specimen" almost amounts to a return to the situation before 1999 and largely nullifies the progress introduced in the *Code* by Article 16.4.1. It still allows nomina to be created entirely within language, without objective reference to specimens, and is therefore a half-way measure which seems questionable. Under this interpretation, the post-1999 nomina mentioned above (*Lophocebus kipunji*, *Avahi cleesei* and *Cebus queirozi*) are hoplonyms (nomenclaturally available).

However, another interpretation (I2) of this article is possible. Under this reading, the case (R3) above would be acceptable, but not the case (R2). In the latter situation, the species was described on the basis of a living, therefore then "extant" specimen, and Article 16.4.2 would therefore require its deposition in a collection, or statement of intent of such a deposition. Under such an interpretation, it is not acceptable to release this specimen free, as this would contravene the dispositions of this article. Therefore, description of a new species based on a living specimen would allow availability of nomen only if the specimen is, or will later be, deposited in a collection. Under this reading of the *Code*, the latter would give no license to release a holotype after capture, description, photograph and possibly taking off a sample of blood, feather or hair for DNA analysis. If this is accepted, the three nomina listed above (and others in the same situation) are anoplonyms (nomenclaturally unavailable).

As recognized by Polaszek *et al.* (2005), the current writing of Article 16 does not allow by itself to choose between these two interpretations. The choice by Wakeham-Dawson *et al.* (2002) and Polaszek *et al.* (2005) of interpretation (I1) seems to be based on two widely different elements. The first one is Article 73.1.4, which, as mentioned above, allows designation of a figured specimen as onomatophore without limiting date (i.e., even after 1999). If interpretation (I2) was considered valid, then Articles 16 and 73 would be in contradiction. The second element is the fact that interpretation (I1) is supported by current and past members of the International Commission on Zoological Nomenclature ("the Commission" hereafter), including its current (Andrew Polaszek) and preceding (Philip Tubbs) Secretaries, so it would seem to correspond to the "intention" of the authors of the current edition of the *Code*, who did not wish to make deposition of a holotype in a collection compulsory for nomen availability. However, when "juridical" texts like the *Code* are concerned, the intention of the draftsmen is of little importance, what counts is the final text. The current text being ambiguous, it should be clarified in the next edition of the *Code* by adding some precisions. It can be so in two different directions.

If the aim is to support interpretation (I1) above, a single change is required: (C1) a second part should be added at the end of Article 16.4.1, stating that "this or these specimen(s) may be extant or not".

If the aim is to support interpretation (I2) above, three changes should be brought to the present *Code*. (C2) Article 16.4.1 should be written as follows (or an equivalent writing): "by the explicit fixation of one or several extant specimen(s) as holotype or syntypes ..."; (C3) the first 8 words of Article 16.4.2 should be suppressed and this article should start with "by a statement..."; (C4) Article 73.1.4 should start with the words (or equivalent): "For nominal taxa created before 2000".

Until changes are brought to the current writing of the *Code* in either of these two directions, the ambiguity described above will remain, but as the current officers of the Commission are not in favour of forbidding description of a new species without an onomatophore, they are likely to "impose" their interpretation to the international community of taxonomists. Under this interpretation, there is no contradiction between Articles 16 and 73, whereas under the interpretation (I2) these two articles are not consistent, and one of them, at least, should be changed.

Thus, under interpretation (I1), favored by the Commission, the current *Code* allows to create a new nomen without an extant specimen, especially if an illustration of this specimen exists. Is such a Rule indeed appropriate? Let us explore this question in more detail.

Illustrations as onomatophores

In botanical nomenclature (McNeill *et al.* 2006), the onomatophore of a specific or infraspecific nomen can be either a specimen or an illustration (Art. 8.1). In the latter case, the botanical code makes it quite clear that the onomatophore is the illustration, not the specimen shown by the latter, although it is recommended to go back to material specimens for nomen allocation: "When a holotype, a lectotype, or a neotype is an illustration, the specimen or specimens upon which that illustration is based should be used to help determine the application of the name" (Art. 8.1). Such Rules have an important consequence: as the illustration itself is the onomatophore, the fact that the specimen on which the illustration was based is now lost does not allow to designate a neotype for the taxon.

The situation is different in zoology. According to the Rules of the current *Code*, the status of illustrations as basis for the creation of new zoological nomina depends on the date of publication. For nomina published before 1931, one possible "indication" that can be used to make them available is defined as follows in Article 12.2.7: "the proposal of a new genus-group name or of a new species-group name in association with an illustration of the taxon being named, or with a bibliographic reference to such an illustration". Therefore, before 1931, a new nomen could be created even without a verbal description or definition of the taxon for which it was intended. This is no more possible after 1930, as after that year Article 13.1.1 requires that a nomen "be accompanied by a description or definition". However, in this article it is not stated that an author must have had a specimen in the hands to write a description or indication, and the latter may well have been prepared on the basis of an illustration. The new Article 16 does not suppress this possibility. It just requires an explicit fixation of an onomatophore, but not clearly that this specimen be "an extant specimen". This is further confirmed in Article 73.1.4 copied above.

There is a basic difference between the botanical and zoological codes as concerns the status of illustrations as onomatophores. In contrast with the botanical code, the zoological code makes it clear that the onomatophore is the specimen(s) figured, not the illustration itself. This has an important consequence regarding the situation, which is rather common when old illustrations are concerned, where the specimen(s) used as a basis for the illustration is/are now lost or destroyed. In such a case, the onomatophore is no longer extant, which opens the possibility to designate a neotype for the taxon if the conditions of Article 75.1 are met, i.e., when "an author considers that a name-bearing type is necessary to define the nominal taxon objectively". This is a very useful particularity of the *Code*. In particular, it allows to settle at best the nomenclatural status of nomina created in old works on the basis of syntypes consisting in several specimens and/or illustrations, especially when these were of different origins and likely to belong in different taxa. One possible procedure in such cases, used e.g. by Kottelat & Lim (1993), Dubois & Ohler (1995) and Kottelat & Persat (2005), and illustrated and explained in detail in Dubois & Ohler (1997a–b), is to solve the ambiguity attached to the nomen by a nomenclatural action involving two distinct steps: first, to designate as lectotype one of the specimens figured, which can allow for example to restrict the type-locality of the taxon and to eliminate the other syntypes from the onomatophore; and then, taking advantage of the fact that this specimen is no more extant, to designate a neotype from the same locality.

So, despite its new Article 16.4.1, the current *Code* still apparently leaves open the possibility to create a new nomen on the basis of an onomatophore shown in an illustration but not available nowadays for study, i.e., a virtual or missing specimen. Clearly, some authors are in favour of this system, and others not. Let us consider the pros and cons of this system.

Arguments for and against basing nomina on virtual or missing specimens

Favourable arguments

(1) The conservation issue

The first argument in favour of accepting availability of nomina even in the absence of extant onomatophore deposited in collections is of course the "conservation" one. It does not seem adequate to collect and kill even a single specimen of a species that, at the very moment of its discovery, appears to be on the verge of extinction. This reason was given by the authors of the primate and bird nomina mentioned above to describe these species without material onomatophores.

This argument in fact contains two different aspects. The first one is that it is genuinely believed by these biologists that capturing and fixing even a single specimen of such species may indeed have a major impact on the survival of the latter. This will be further discussed below. The second one is in fact quite distinct: it is that killing a specimen of such an endangered species would certainly not be understood by conservationists and more largely by "the public". Such a behaviour would appear "irresponsible" to these people, and, above all, would contribute to give a bad image of taxonomists to outsiders of the discipline of taxonomy. As the latter is already poorly understood and appreciated among biological sciences, and, by way of consequence, severely underfunded and much too short in professional positions (Dubois 2003, Wheeler *et al.* 2004), any action that might contribute to undermine its image should be avoided by all means. Although they rarely state it clearly, this second motivation might be more important than the first one for taxonomists who decide to describe new species without fixed specimens.

(2) The difficuty or impossibility of collecting or conserving specimens

Some material reasons may make it very difficult or virtually impossible to collect or preserve specimens of a new species. This is in particular the case of some marine organisms, especially of very large size (such as some cephalopods or cetaceans) or living in deep habitats. Some of these organisms may be observed and photographed, e.g. from a deep-sea submersible, but not collected. Should taxonomy be deprived from dealing with such organisms because taxonomists cannot have them in the hands? In such cases, it could appear that naming such taxa on the basis of photographs alone is justified. This point will be discussed further below.

A related case would be that of organisms which for some reason, after collection, cannot be conserved in such a way as to allow their subsequent study. However, this case seems to be mostly a theoretical possibility as, although some organisms are more difficult than others to fix and conserve properly, it is usually possible to find appropriate, even if unusual, modes of conservation for them.

(3) Descriptions based on ancient illustrations

This case might be the most convincing one for the formal description of species without having actual specimens in hands. Ancient iconographic documents are sometimes used by some taxonomists to provide evidence that the specimens which were used to produce these illustrations belonged indeed in unknown, or at least undescribed and unnamed, zoological species. This may even in some extreme cases be possible using solely descriptions in words, without illustrations, when these descriptions are detailed enough, and apparently accurate enough, to warrant such conclusions.

A good example of this situation is the formal description and naming by Bour (1978) of a new tortoise from the Mascarene, based on illustrations published in 1737 that were precise enough to allow ascertaining the diagnostic characters of this species, which had become extinct around 1840 as a result of man's exploitation (Bour 1984), and which was until then known only by imprecise descriptions of travellers. Interestingly, this description prompted the discovery of subfossil remains of the same species, which allowed a more complete redescription (Bour 1979), and later to show that this species was in fact the one that had been originally named *Testudo indica* Schneider, 1783 on the basis of a holotype, still extant, but which had been considered for two centuries of unknown origin (Arnold 1979, Austin *et al.* 2002). Such exceptional discoveries will no doubt remain possible in the future, and it certainly would not be appropriate to forbid the naming of such species because no specimen is available.

Unfavourable arguments

(1) Hypothetical concepts

The *Code* expressly excludes from its domain nomina proposed for animals not known with certainty to exist or to have existed in nature, "but only in the mind of the author whether a prediction or not". This definition may seem clear, but needs further information to become operational. The only way to be sure that an animal does not exist only in the mind of a person is to be able to examine a specimen. Such nomina can well be "defined", even "phylogenetically", but they may not correspond to any organism in the real world. A striking example is provided in a paper where many hypothetical groups of amphibians were defined (Lescure *et al.* 1986), based on phylogenetic hypotheses that were not supported by subsequent works (Nussbaum & Wilkinson 1989), so that these taxa fully correspond to the notion of "hypothetical concept" as defined in the *Code*.

As discussed below, a photograph by itself cannot be used as an objective proof of the existence of an animal, and a verbal description or a testimony, even if supported by several witnesses, cannot qualify as a scientific evidence, for several reasons spanning from observations that are inaccurate (although honest) due to various material reasons, to deliberate falsification or pure invention. Good examples of such problems are those posed by the various "mythical animals" that have been "seen", sometimes by many "witnesses", but for which material evidence is still missing, such as the abominable snowman and its avatars (yeti, migu, barmanu, sasquatch, etc.), the Loch Ness monster and various "sea snakes" and other marine monsters. Most of these stories are purely verbal, but some "material documents" indeed exist, such as "photos" of the Loch Ness monster or of the sasquatch, or recordings of the voice of the Caucasian barmanu, which all have in comment to be of "bad quality" (photos out of focus, recordings with noisy background, etc.).

In a few cases, Latin nomina were indeed proposed for such "animals", despite the absence of specimens, but on the basis of testimonies, descriptions, traces such as footprints, hair or "scalp", or even photographs. An interesting case is that of the "iceman" formally described and named *Homo pongoides* on the basis of a specimen purported to have been examined through ice in an itinerant circus, but which later "disappeared", and for which several photographs and drawings were published (Heuvelmans 1969, Heuvelmans & Porchnev 1974). What can science do with such "descriptions" and nomina? How can the criterion of Article 1.3.1 for exclusion of "hypothetical concepts" be applied? Is the nomen *Homo pongoides* a hoplonym or an anoplonym, and, if it is a hoplonym, what is its status? Valid nomen, synonym, *nomen dubium*? If deposition of a specimen in a public collection was compulsory for availability of new nomina, such a question would not be raised, and formal description would have to await capture of a specimen or discovery of remains attributed to this "taxon".

(2) Phantom nomina

This concept was coined by Vences *et al.* (1999) for new nomina "accidentally" published without proper descriptions and identified vouchers in amateur publications or animal shop catalogues dealing with animal groups that attract many hobbyists (in their case brightly colored frogs of the genus *Mantella* Boulenger, 1882), on the basis of photographs of live specimens later sold to customers. These authors discussed the major problems posed by the proper allocation of such nomina to taxa, then wrote: "editors of hobbyist journals should not permit their authors usage of new scientific names to name undescribed or undetermined mor-phs unless the names are accompanied by a formal description and type specimens are deposited in a publicly available scientific collection" (Vences *et al.* 1999: 56). For many taxonomists who work on such "attractive" animal groups (e.g., insects, molluscs or vertebrates kept alive by aquariophilists and terrariophilists), the new edition of the *Code* was received with relief, as the common sense interpretation of the new Rule of Article 16.4.1 is that it now imposes the deposition of onomatophores in public collections for new nomina to be nomenclaturally available. But as this interpretation is not supported by Articles 16.4.2 and 72.5.6, nor by officers of the Commission, taxonomists working on such groups should remain vigilant and expect new problems similar to those described by Vences *et al.* (1999).

(3) Photographs as scientific evidence

There is a widespread but unfounded belief that photographs are "better scientific evidence" than mere written descriptions or even drawings or paintings. There are several reasons why this belief is unfounded. First, photographs have always been liable to be falsified, and faked photographs have indeed been used in many occasions, from political propaganda to commercial or juridical affairs, including science. A recent example in zootaxonomy concerns the new species of coelacanth from Indonesia described as *Latimeria menadoensis* (Pouyaud *et al.* 1999), but for which shortly after a faked photograph was submitted for intended publication in *Nature* (McCabe & Wright 2000). Nowadays, with digital photographs, faking has become even easier and virtually undetectable, and photographs should not be considered reliable proofs by themselves for anything. Faking is also possible with specimens, of course, but such falsifications, whether simple hoaxes or intended to promote particular ideas or to support a personal's carrier, are usually discovered later on by careful examination of the material, as was the case, e.g., for the "Piltdown man" (Weiner *et al.* 1953), but such deceptions may be more difficult to demonstrate with digital photographs.

But faking is not the only reason why photographs are not the best way to know the characters of biological species. Characters are not "facts" that would not depend on the subjectivity of observers. They are interpretations of reality, usually based on a given "reading" by man of the phenotypes of organisms. They depend on scientific judgements and decisions concerning homology, similarity and difference. In this respect, descriptions using words, or scientific drawings, are more informative, because they highlight some features and ignore others, that are considered of no or little relevance for the characterisation of a taxon. In contrast, the implacable objectivity of photographs, which capture in the same manner basic and "meaningless" characters of the specimens, or even sometimes artificial details such as shadows and lights — except, once again, if photographs are modified to show special features, but then we come back to the problem above —, does not provide as much help to taxonomists.

Even with the best goodwill, study of photographs for taxonomic work implies the risk of misinterpreting some characters, of missing others, and sometimes of "inventing" still others. An enlightening example of the latter situation is provided by the recent decription of the new taxon *Torquerator bullocki* (Holland *et al.* 2005). This organism belongs in a group of deep-sea hemichordates that were known from photographs but had not been previously collected. On the basis of the interpretation of the photographs taken by submersibles, where these worms appeared to have collar tentacles, these organisms had been considered a missing link (the so-called "lophenteropneusts") between two main hemichordate body plans, the enteropneusts and the pterobranchs (Lemche *et al.* 1976), and this in turn had influenced ideas about the origin of vertebrates. Collection and study of a specimen of this group showed that these interpretations were wrong: "The collar, although disproportionately broad, lacks tentacles. In addition, we find no evidence of tentacles in the available deep-sea photographs (published and unpublished) of broad-collared enteropneusts, including those formerly designated as lophenteropneusts. Thus, the lophenteropneust hypothesis was based on misinterpretation of deep-sea photographs of low quality and should no longer be used to support the idea that the enteropneust body plan is basal within the phylum Hemichordata." (Hammond *et al.* 2005: 374). In this case, it is therefore fortunate that Lemche *et al.* (1976) were prudent enough not to publish a formal description and naming of these organisms on the basis of photographs alone, as the Latin nomina that could have been created for this purpose would have turned out to be anoplonyms, being based in fact on "hypothetical concepts". In fact and more exactly, they wrote that the nomen Lophenteropneust was "intended to cover a group above the family level and thus no subject to the rules of nomenclature" (Lemche *et al.* 1976: 292), so that if in the future class-series nomina are incorporated into the *Code* (Dubois 2006a) the status of this nomen will have to be settled.

There is no need to turn to deep-sea organisms to encounter problems with descriptions of new taxa based only on photographs. Examples of such problems, discussed by Pauwels & Meirte (1996) and Pauwels & Chérot (1997), include the description of the "Loch Ness monster" as *Nessiteras rhombopteryx* by Scott & Rines (1975), that of *Cryptophidion annamense* by Wallach & Jones (1992) and that of *Cadborosaurus willsi* by Bousfield & Leblond (1995). These cases, and several other ones, belong in the domain of "cryptozoology", a pseudo-science created by Bernard Heuvelmans on the basis of a misunderstanding, because he thought that onomatophores were required by the *Code* for description of new zoological taxa (Pauwels & Chérot 1997): in fact, they were not then, but the problems created by such descriptions led many zoologists to hope that the fourth edition of the *Code* would require the designation of an onomatophore and its deposition in a collection for nomen availability. In the absence of such a Rule, it is formally impossible to exclude from zoological nomenclature some extreme cases of "hypothetical concepts" described as new taxa. Thus, the description by Quintart (1989), as *Marsupilami franquini*, of the marsupilami, an imaginary animal created in cartoons by Franquin, was recorded in the *Zoological Record*, and there is no reason why the Rhinogradentia, imaginary organisms described with extravagant details by an imaginary professor (Stümpke 1962), should not be so!

(4) Alive specimens as onomatophores

In the recent years, some new species were described with live holotypes, maintained in captivity in zoos or vivaria. Although zoological gardens can be considered as a special kind of "collections", keeping live instead of dead animals, their status is quite distinct from collections of museums, for several reasons. First, as long as it is alive, a specimen may escape and disappear forever. It may also die, and its death may not be noticed immediately by the responsibles of its keeping: it may then be eaten, entirely or partly, by other captive animals, including "preys" provided for its feeding (crickets will rapidly eat a frog specimen after its death in a vivarium), it may desiccate or putrefy, etc. Even if found rapidly, in many cases, such a holotype will often not be as well fixed as a specimen killed and fixed carefully for proper subsequent study. Thus, even if the "intention" to fix and keep the specimen in a museum collection after its death is announced, for example in giving it already a collection number even before its death (e.g., the holotype of *Varanus melinus*, see Böhme & Ziegler 1997), this intention may not be fulfilled later on.

What can be the reasons for keeping a holotype alive instead of killing it before description of the new taxon? One of them may be to obtain its reproduction in captivity, which may be all the more desirable as the species is rare and endangered. This can be a good reason only in some cases: specimens of both sexes must be available (in taxa with separate sexes), and breeding must be feasible in captivity. These conditions are not always met, far from that. Other reasons may be to do ethological observations on this specimen in captivity, or simply to show the animal to the public (which is usually the case in zoos). No need to say, in many cases (e.g., in mammals and birds), behaviour in captivity is widely different from behaviour in the field, and the information that will be so obtained will be of little help to know the species better. The question should therefore be asked in all such cases: is the potential benefit that can be derived from keeping the specimen alive worthy of talking the risk to see this specimen escape, or be eaten or injuried by others, or desiccated or rotten, instead of having a well-fixed holotype in a nice position allowing good morphological studies? In many cases, the answer to this question will be "no". But then we come to another problem, the real "mawkishness" of many zoologists nowadays, which results in a number of them been simply reluctant to kill animals, for so-called reasons of "ethics". This problem is explored further below.

The conservation issue

Let us come back here to the conservation issue, in a different perspective from that presented above. If a species is found so critically threatened by extinction that the collection of a single individual would be a risk, then it is quite possible, not to say very likely, that this species will not survive long in nature due to obvious reasons of population dynamics and genetics. In this situation, what is ethical? To allow the species become extinct without documenting the loss? On the contrary, isn't it then an ethical responsibility of zoologists to keep at least one specimen in a museum to document the existence of a species which became extinct during modern times, in most cases as a result of human action? From a scientific point of view, this course, documenting the biological information on diversity, is certainly preferable to that consisting in leaving this species become extinct without keeping a single material testimony of its existence for future generations of biologists. Then, if a species is threatened by extinction, it is *an additional argument* to keep a specimen in a museum, not to the contrary.

It is quite likely that "extreme conservationists", and even perhaps most "conservationists", will not agree with the statement above. They will probably say that, as long as a species has "a chance" to survive, it should be left this chance. Some of them would certainly even push this argument further, and suggest that, even when only one specimen of an undescribed species remains alive, and has no possibility to leave an offspring, it should be left alone, free and untouched — whereas a responsible taxonomist would certainly think that this specimen should be either immediately killed and fixed, or kept carefully in captivity for preservation at its death. We are in fact here in front of *genuinely different* approaches to species extinctions on our planet. Many conservationists think that conservation should be the first priority in all cases, even when the chances of recovery of the species are very weak or null, and even when this attitude threatens the possible obtention of basic biological information on this species. In contrast, many taxonomists will think that preserving at least one specimen in order to preserve *information* for science, should be the priority in such situations. Both points of view have supporting arguments, and there is not "one truth" in this respect. What will be decisive in the end is the relative social influence of the supporters of each approach. In this respect, it is clear that nowadays conservationists have built up strong social lobbies to support their ideas, which is not the case of zootaxonomists — who have shown until now very little aptitude for social communication and power (Dubois 2003) and who have not even proved able to create an international scientific society, not to mention a lobby (Dubois 2006c). But this does not demonstrate in the least that the former are "right" and the second "wrong" — only that the former are socially more efficient (which is widely different, and illustrated by many recent decisions of "policy makers" in science, a matter which is far beyond the scope of the present paper). At any rate, taxonomists should feel free to consider both options, and to do what they think is best, not what members of another community think is best in order to please so-called "social demand", which is in fact merely the demand of one social group, not of society as a whole.

As a matter of fact, the question may be asked whether the "message" that conservationists (at least those who fight against the collection of specimens to document the diversity of life on this planet) want to pass to "society" is the good one. This message is as follows: yes indeed, for centuries, and especially in the last decades, human societies have made "choices" (sometimes without realizing that they were doing so) that had major negative impacts on the ecological equilibria of the planet we live on, and in particular they have been (and still will be) responsible for innumerable species extinctions; however, some of their members at least have now become conscious of this problem, and have decided to do everything possible to stop this process. These persons think that the major priority of the next decade should be to "stop the erosion of biodiversity". Until this point, this message is likely to be agreed upon by most biodiversity-oriented biologists, including conservationists and taxonomists. But consensus is absent when it comes to two further statements: (1) collection of specimens by taxonomists and for museums is a major factor of species extinctions; (2) we have the power to "repair" the destructions that our civilization has done. Let us consider these two statements.

As oultined by Patterson (2002), not a single case is known where *scientific* collecting has imperiled or caused the extinction of any Neotropical mammal, and we do not know of a single case in any other zoological group. In a few cases of species with commercial value, either as brightly colored, spectacular pets (especially in vertebrates), or as "rare" and very appreciated collection items (especially in insects and molluscs), massive collection may have contributed to deplete or even wipe out some populations or species, but this has nothing to do with taxonomic research and museum collections. Even when taxonomists collect what they consider to be "large series" of specimens (quite useful for the appreciation of intra- and interpopulational variation, and therefore for the characterisation of specific and subspecific taxa), such series are ridiculously small compared with the captures made for human consumption, by pet trade or by insect or mollusc collectors. It is hypocrit, misleading and ill-directed to confound both activities.

Taxonomists, who are an infime minority with a very little power, cannot be the scapegoat for all the mistakes and crimes made by our societies in the last century. It may be appealing to throw back all responsibilities on this small and weak community, but it does not solve anything. Furthermore, even if this is not appreciated by many, practising field taxonomists are in fact among the persons who have the best knowledge of real biodiversity in the wild, and their daily experience is that extinctions are going on at a very rapid pace, in many habitats but mostly in tropical areas, as a result of factors such as deforestation, destruction of humid zones, pollutions of all kinds, climate changes, faunistic and genetic pollution (Dubois 2006c), etc. Most of these destructions are of such a magnitude, and show no significant trend of change (despite repeated declarations and statements), that it is completely misleading to pretend that these phenomena will stop in the next decades, not to say that our civilization will "repair" the results of its mistakes.

Many of these debates, however, are carried out as if we were in an "ideal" world where it would be enough to say something to see it happen. In the just recent years, many members of our societies (who were still, several decades ago, treating those of us who were announcing massive extinctions, of birds of ill omen or simply of liers) have progressively become conscious that our civilization is indeed destroying a large proportion of the species biodiversity of our planet. This is a nice step, but as long as it is not followed by major changes in major options of our world, regarding industry, economics, profit and decision-making, this consciousness-raising will have little material impact. Words won't replace action in this respect, and as long as our societies do not make these major changes, extinctions will go on. Saying and writing the contrary is lying to the public. And it is a lie to say that we will "repair" the damages we have done.

Promoting the idea that collecting *one specimen* for the taxonomic and nomenclatural purpose to have an onomatophore, i.e., a testimony of the existence of a species for present and future researchers, is a major factor of species extinction, is an hypocrisy and a lie. It does not help "conservation biology" to reach any of its aims — but it may appear easier and less costly to pretend so than to struggle against industrial lobbies or shareholders of companies responsible of the current disaster. Taxonomists should resist this pressure, and organize themselves for this resistance.

Today, "conservation" appears to many as a more laudable aim than "knowledge". However, one of the major aims of science, besides helping man to act efficiently in mastering the causes and effects, is "simply" to "understand" the world we live in. One of the major aims of comparative (i.e., non-reductionist) biology is to understand how evolution has proceeded, and to reply these "how" and "why" questions it is first necessary to reply "what" questions (Mayr 1997). With less, or possibly much less, than 10 % of the living species of our planet yet collected, described and named, we cannot say that we are close to answering the "what" questions of biodiversity (Dubois submitted-a) — which means that we are still far from being able to answer the "how" and "why" questions. Isn't it legitimate to think that answering these questions should remain a major goal of science and culture?

The gigantic recent progresses in molecular study of organisms, especially through the use of nucleic acid sequencing for molecular phylogeny, have tended to obscure the nature of biodiversity for many zoologists, some of whom have no or almost no "culture" in morphology, anatomy, behaviour, etc. As interesting as knowing the DNA sequences of an organism may be, these won't tell us everything about the organism. Until the phenotype, behaviour, ecology, of a species have been studied, we know almost nothing about this species, even if we have an hypothesis on its phylogenetic position and if we are able to "recognize" it by its DNA

Fortunately, in front of those who think that everything about organisms can be known from their and photographs, the irreplaceable rôle of vouchers and specimen collections in systematics, and more generally in all works on biodiversity, has been outlined repeatedly by workers in botany (Funk *et al.* 2005), herpetology (Stuebing 1998), ornithology (Goodman & Lanyon 1994, Remsen 1995, Winker 1996) and mammalogy (Patterson 2002).

The contribution of a specimen to our knowledge about biodiversity is roughly inversely proportional to its rarity. Several steps can be distinguished in our knowledge of a species through specimens. The first one is passing from *no* specimen to *one* specimen. The second one is passing from one to several from the same population, especially to a second one of the opposite sex. A third step can be recognized when small series of specimens, e.g., of 8–20 specimens of each sex from a population, are available, as these allow simple statistical tests for comparisons of samples (Dubois 1984), and a fourth step is attained when samples from several populations referred to the same species have been collected. Among these steps, the one which is by far the main one, for our knowledge, is the first one. The number of characters that can be studied on a specimen is virtually endless (Dubois & Ohler 1997a), and a single holotype allows innumerable observations, especially when non-intrusive techniques such as radiograph or scanner are used. But lacking a holotype, even when DNA or photographs are available, precludes a number of studies.

Recent trends for opposition to collecting specimens are, at least, in the eyes of taxonomists and evolutionary biologists, based on a ill-understood approach to "ethics", chosing ignorance in the name of "conservation", although it is clear that efficient conservation cannot be based on ignorance. This was a rarity a few years ago, when a student in a field research party could decide to release at night a specimen of a new species of salamander kept alive in a plastic bag (David Wake, personal communication to AD, about the specimen of the new species *Bolitoglossa jacksoni* shown in fig. 6 of the paper by Elias 1984). Nowadays, when finding a unique specimen of a lizard species considered extinct and rediscovered after 130 years, even a professional zoologist may decide to photograph and release it (Ineich 2006): what could have been in a rather recent past considered a professional misconduct is now more or less imposed by the "ethically correct" tyranny. This is part of a more general trend in which some students may now embark on higher studies in biology but refuse to kill specimens or to experiment on them. If this trend goes on, zoologists may be forbidden to collect specimens even in order to photograph them or take a feather or a drop of blood from them, in order not to "disturb" them. This would indeed remind the obscurantist medieval times when anatomists and physicians would be forced to dungeon or to stake for having dissected human bodies.

Winker (1996) identified five causes for the opposition to collecting specimens for biodiversity studies: (1) focusing conservation at the level of the individual; (2) unfamiliarity with population biology; (3) misunderstanding of scientific research; (4) typological thinking; and (5) misplaced morality. Except for (4), all these factors are active in the opposition to collection and fixation of even a single specimen as holotype for a new species, and should be countered by taxonomists.

When Vieilliard (1976) described the new Kabyle bird species *Sitta ledanti*, he collected, killed and fixed one adult male for holotype and one adult female for paratype, although he was then aware of the existence of only a dozen of couples. No doubt if an ornithologist was doing this today, he would face difficult time with "conservation biologists". Nowadays, although still threatened, this species is still alive and other populations have been discovered (Bellatreche 1991, Doumandji & Kisserli 1993). However, the important point regarding the present discussion is that, if unfortunately this species had become extinct, the existence of one specimen of each sex in a museum collection was liable to provide major information on its morphology and anatomy which descriptions and illustrations alone could not provide. Taxonomists should care for obtaining such basic, "minimum" material, for all new species they discover and will discover in the coming years and decades.

The media and laymen are very excited everytime a new fossil species of dinosaur or humanoid, or a large species of living mammal or bird, is discovered, but interest is much weaker for less "extraordinary" discoveries, especially of organisms smaller, more discrete, or less close to our own species. Zoologists and especially taxonomists are not bound to share this approach, and may feel that any obscure mite or sea snail is as importo knowledge as a dinosaur. One way of making sure that discoveries of new species are transmitted to our descendants is not only to describe them but to keep voucher specimens in museums and other permanent collections. Nomenclatural Rules, in obliging serious taxonomists to keep at least one specimen of each described species, are a strong support for such an activity. The progress made in Article 16 of the last version of the *Code* should be made more irreversible by making this article more stringent. The need of depositing an onomatophore in a permanent public collection should be recognized for standard publications of species. However, some of the problems mentioned above should also be addressed. We therefore provide below some suggestions and recommendations in this respect for the future.

Proposals regarding the Rules of nomenclatural availability of nomina

Biology needs a universal and unambiguous language for the designation of taxa, and this language is provided by the codes of nomenclature. For a smooth and efficient functioning of these codes, some principles must be respected (Dubois 2005: 375–378). An important principle is simplicity, especially the fact that Rules are unique and general and contain as few exceptions and special situations as possible. In zoology, the current *Code* contains already too many exceptions and particular cases (especially Rules that are valid only until a certain date, or after a certain date), and if it was to be changed in this respect, this should be in the sense of simplification and uniformisation, i.e., of suppression of exceptions and particular cases. It would therefore not be appropriate to consider the introduction of special Rules for the availability of nomina, e.g., for "very endangered species", for "very rare species", for "species difficult to collect" or for "extinct species known only from iconographic documents". The same Rules should apply to all animal taxa, whether large or endangered, rare or common, living or extinct. However, there should be room within these Rules to deal appropriately with all specific cases and situations.

In our opinion, Article 16 should be made more stringent regarding the need of onomatophore deposition. We think the major strength of the *Code*, and its superiority over alternative nomenclatural systems that have been proposed, lies in its being based on onomatophores for allocation of nomina to taxa: this establishes a connexion between the world of organisms and that of language, and allows this allocation to be objective, not based on interpretations of definitions. We think the need of material onomatophores (i.e., specimens, not photographs, sound recordings or molecular sequences) for the availability (and hence validity) of zoological nomina should now become even more stringent than in the past. This would insure not only to maintain this objective reference for ascertaining the status of nomina, but also to make sure that at least one specimen of every new species described in this century will be the matter of a legacy to our descendants. This does not mean however that collection of specimens should be made blindly and without care for problems of species conservation. Regarding the latter problems, we think two different approaches should be combined: (1) the careful choice of specimens collected and fixed; (2) in some cases, the recourse to alternative approaches, i.e., delaying naming or naming through a specific action of the Commission.

The first way to conciliate the concerns for conservation issues with a *Code* requiring that at least one specimen should be held and conserved in trust for science, is through the choice of this specimen. In most cases, especially involving vertebrates, a male (preferably an older one, which has greater probability of having reproduced and of not being able to do it again) should be preferably kept instead of a female, due to the potential lower impact on the effective number of the population. In some other cases, when the sex ratio is particularly skewed, the specimen should be taken among the most abundant sex, and if several widely different phenotypes are observed, the most common one should be chosen.

Now, we have seen above that, in some cases, it is indeed useful to have the possibility to describe a new species without having a specimen in hand. It might indeed be the case in some exceptional cases (although not as a routine procedure) for species threatened with extinction but which might still survive if we do not fix men (e.g., a species for which only one couple would still be alive). It might be the case for some which are indeed (at least for the time being) impossible to collect or to conserve. Above all, it has and will certainly again be the case for species that are now (or are now believed to be) extinct, but for which illustrations or descriptions are available and informative enough to allow the proper description and naming of a new taxon.

In such cases, two different situations must be distinguished. In the first one, the possibility exists to obtain later a specimen that could be deposited in a collection as onomatophore. This may be after more precise estimates of the number of alive specimens of the species have been obtained, ascertaining that they are more numerous than initially thought, and allowing to collect one of them. This may be after recovery of an initially very low population, with increase in its size. This may be after discovery of other populations of the same species. This may be after permanent close watch of the relict population, allowing to collect one specimen after its natural death. This may be after techniques have been developed allowing to capture a specimen although this had long been considered impossible (as in the case of *Torquerator bullocki* mentioned above). In all these cases, it is certainly much better to wait for formally describing the new species until a specimen has been collected and studied. This would avoid basic factual mistakes based on wrong interpretations of photographs as in the example of *Torquerator bullocki*. This course is the one that had been suggested by Timm *et al.* (2005) in the case of the monkey *Lophocebus kipunji*: "Jones and colleagues are encouraged to acquire a specimen, or part(s) thereof, and prepare a new description of this, as yet, undescribed species".

This course raises only one problem, but a genuine one: the risk that (an)other author(s) than the discoverer(s) of the species take advantage of this absence of formal description to collect a specimen, describe and name it to become "author(s)" of the new nomen. Although this is not much mentioned in textbooks, the history of zootaxonomy is full of similar examples, which indeed are a major plague of the discipline, as is well known by all researchers in this field. Interestingly, in the many discussions that have been devoted in the recent years to proposals of changes or improvements that should be brought to the current nomenclatural Rules, few discussed this problem. As was very aptly pointed out by Ng (1994), the function of adding the name of the author after the nomen of a taxon is not to please the author, "to promote the reputation of a scientist or simply an egotistical exercise", but is to help "to keep track of authors, publication dates and to trace the original references", through databases like the *Zoological Record*. Dubois (2000) discussed this matter and suggested that mentioning only the publication year of the nomen, without the author(s)' names, would play the same function and would help limiting artificial inflation of unwarranted nomina provoked mostly by "mihilism", as Bruun (1950) ironically termed it. However, such a change would clearly threaten the egos of so many taxonomists that, although it may be highly desirable (Dubois submitted-b), it may not be easy to implement, as highlighted by the fact that promoters of the *Phylocode* project, who could well have decided not to add authors' names after their nomina, did not apparently consider doing so (Dubois 2005).

A second situation is that of species described on the basis of documents attesting the past existence of a taxon that is now extinct and for which it is unlikely that fossil or subfossil material will be discovered. Such unlikely events sometimes occur, as shown above by the case of the Mascarene turtle. A recent example is quite enlightening: Oliveira & Langguth (2006) elegantly showed that the new monkey species described as *Cebus queirozi* by Mendes Pontes *et al.* (2006) had already been described more than two centuries ago as *Simia flavia* Schreber, 1774. However, such rediscoveries are exceptions and in most cases the species will remain known only from the ancient documents and no specimen will ever be found. In such cases, it would not be clever to impede their formal description and naming because of rigid nomenclatural Rules. So a special solution must be found for such cases.

As mentioned above, there should be a single *Code*, not different Rules for different situations. We think the *Code* already contains a provision that would allow the description of new taxa, in some very exceptional cases, without material onomatophores. Article 10.1 of the current *Code* reads as follows:

"10.1. **General conditions to be met.** A name or nomenclatural act is available, and takes authorship and

> when it has satisfied the provisions of this Article and, when relevant, of Articles 11 to 20 (...). A be ruled to be available by the Commission (...) if these conditions are not fully met."

We think advantage should be taken of the last sentence of this article to solve the nomenclatural problem here addressed. In the exceptional cases where good reasons (as discussed above) would make it impossible to validly name a new taxon under the usual Rules of the *Code*, this could be done through submitting a special request to the Commission. This could take the form of submission of a manuscript for publication in the *Bulletin of Zoological Nomenclature*, the official journal of the Commission, followed by a vote of the latter to validate the new nomen (just like in the cases of normal applications submitted to the Commission for decision). This would be a heavy procedure, but one which would respect the current Rules of the *Code*. It should remain heavy in order to discourage "lazy" zootaxonomists to call upon it, as it should be used exceptionally, and not become a routine procedure. If nothing is done in this direction, it is not unlikely that in the coming decades all new species of primates, why not of mammals, why not of vertebrates, will be described on the basis of photographs or of DNA sequences taken from a hair, a feather or a drop of blood, without even a brief description of the organism, and without material onomatophores. For the reasons explained above, such a move would be very harmful to taxonomy in the future.

Conclusion

Voucher specimens play a crucial, although often misunderstood, role in modern taxonomic and evolutionary research. Among them, onomatophores ("name-bearing types") play a special function, being the objective references for the allocation of nomina to taxa. The Rules of the *Code*, which have been improved in the last edition in making compulsory the designation of a material onomatophore (one specimen or several specimens) for the availability of a new nomen, should also make compulsory the deposition of onomatophores in public collections. In the few exceptional cases where collection or conservation of a specimen is impossible (for difficulties of collecting or of keeping, for conservation reasons, or when the taxon is known only from ancient documents), choice should be made between two possible courses: (1) either preliminary description of the taxon through indirect evidence (photographs, DNA sequence, etc.), but without naming it, pending the acquisition of an onomatophore and its deposition in a public collection, whenever this subsequent acquisition is likely; (2) or formal description of the taxon and proposal of a new Latin nomen based only on photographs, drawings, DNA sequence or other indirect evidence, but then in a paper submitted for publication in the *Bulletin of Zoological Nomenclature*, followed by a vote of the Commission to validate nomenclatural availability of this new nomen under the provision of the last sentence of Article 10.1.

For implementation of these changes in the *Code*, we propose the following new wording for Article 16.4 (no changes are proposed in the four recommendations of this article):

"16.4 **Species-group names: explicit fixation and deposition in public collections of name-bearing types.** Every new specific and subspecific name published after 1999, except a new replacement name (a nomen novum), for which the name-bearing type of the nominal taxon it denotes is fixed automatically (...), must be accompanied in the original publication

16.4.1. by the explicit fixation of a holotype, or syntypes, for the nominal taxon (...), and,

16.4.2 by its deposition in a collection or several, with a statement indicating the name and location of this (or these) collection(s), or a statement that it or they will later be deposited there (see Recommendation 16C).

16.4.3. In the exceptional case where the holotype or syntypes cannot be collected and/or conserved (because the taxon is believed to be extinct, of difficulties or impossibilities of specimen collection or conservation, or because the taxon is threatened with extinction), formal description and naming of the taxon should be postponed until one or several specimens can be collected; if it is unlikely that any specimen will ever be available for deposition in a collection, the taxon should be described and named on the basis of indirect evi-

, ancient document showing an illustration or presenting a description of the taxon, photograph, r data) in a paper submitted for publication in the *Bulletin of Zoological Nomenclature*, and formal ility of this name should be voted upon by the Commission as allowed by Article 10.1."

To complete this change in Article 16, the following new wording should be implemented in Article 73.1.4:

"73.1.4. Designation before 2000 of an illustration of a single specimen as a holotype is to be treated as designation of the specimen illustrated; the fact that the specimen no longer exists or cannot be traced does not of itself invalidate the designation. (...)

We believe these proposed changes in the *Code* would allow to solve the problem raised in recent papers, regarding the description and naming of new species without contributing to their extinction, but without opening the door for a routine description of new species without onomatophores, which would be very detrimental to taxonomy and to our knowledge of biodiversity.

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Does nomenclatural availability of nomina of new species or subspecies require the deposition of vouchers in collections?

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Abstract

Several species of birds and primates recently described opened a debate in the zoological community on the possibility of naming new species or subspecies without material onomatophores ("name-bearing types") deposited in collections. The current writing of the *Code* is ambiguous in this respect. We support here the view that such practice is not doing a service to the discipline of taxonomy as illustrations, DNA sequences or "definitions" cannot replace voucher specimens. The latter are and will be badly needed for the proper knowledge of the vanishing biodiversity of our planet. We review arguments pro and con the need to have a Rule in the *Code* requiring the deposition of onomatophores in collections for the proper and valid creation of new nomina in zoological nomenclature. In conclusion, we propose a more drastic Rule in this respect but also the possibility, in some exceptional cases, to apply to the International Commission on Zoological Nomenclature to make nomina available even in the absence of material onomatophores.

Key words: Biodiversity crisis — Nomenclatural availability — Vouchers — Onomatophores — Collections — Illustrations — DNA sequences — Definitions — *Code* — Commission

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Introduction

This paper discusses an important question of zoological nomenclature at the verge of the "century of extinctions" (Dubois 2003): that of the *nomenclatural availability* and consequently *validity* of zoological scientific names or *nomina* (Dubois 2000) published without *onomatophores* ("type-specimens"; see Dubois 2000, 2005) deposited in a collection. This problem has been raised recently for several species of vertebrates considered "rare and endangered". It is only one avatar of a new tendency in taxonomy, consisting in the description and naming of new taxa without voucher specimens, e.g., based only on molecular evidence, even when no threat on the taxon is currently identified, or of taxa "defined" through "phylogenetic definitions" but without vouchers or even diagnostic characters. Such problems may become more and more common if the strict and clear Rules of the *International Code of Zoological Nomenclature* (Anonymous, 1999; "the *Code*" hereafter) regarding nomen availability are not understood and adopted by all zoologists and scientific editors.

As it develops, the biodiversity crisis — mainly caused by anthropogenic factors — will more and more face zoologists with the ethical dilemma of sacrificing specimens potentially important for the survivorship of their species in order to satisfy the minimum criteria established by the *Code* to make a new nomen available. This situation already exists but will tend to become more frequent in the forthcoming years, as extinctions will go on and as new taxa — especially of vertebrates — will be discovered in isolated refuges, with small relict populations and therefore highly threatened with extinction. Whereas some taxonomists aim to rely on scientific objectivity and precision through the deposition of fixed reference specimens (onomatophores) in public collections, some are also tempted to skip this procedure to give new discovered species with tiny populations a better chance of surviving. However, the *Code* does not provide special conditions for describing "endangered" species, and its Rules for the nomenclatural availability of nomina must be followed if the latter are to be used validly to designate zoological taxa.

This problem concerning onomatophores is but one special example of a more general trend in recent scientific literature dealing with systematics, phylogeny and evolutionary biology, where the important role of vouchers is underestimated, if not ignored or denied (Funk *et al.* 2005). This is illustrated by the fact that some major databases such as Genbank do not require the indication of voucher specimens associated with the information they store (molecular sequences in the case of Genbank). The case of the classical cytological studies in botany reminded by Funk *et al.* (2005: 127) is exemplary of what could be the fate of some of the data in Genbank and other databases: "the absence of vouchers for literally thousands of early chromosome counts — a majority of all counts made prior to 1965 — has rendered those data essentually worthless: the identity of the plants cannot be verified. The enormous effort made by those early cytologists comes to little or nothing at all."

No rules oblige taxonomists to deposit vouchers when they describe a new species, simply because there is no "code of taxonomy" — for reasons detailed by Dubois (2005). However, as soon as not only describing, but also naming is involved — a distinct process, which belongs in nomenclature, not in taxonomy proper —, vouchers are necessary. Although the nomenclatural role of these special vouchers is particular (to provide an objective standard for the allocation of nomina to taxa; see below), these specimens have also "incidentally" an important taxonomic function, that of providing material references for the characters described by taxonomists. Because of this secondary, taxonomic, function of onomatophores, the *Code* so to speak fills a deficiency caused by the absence of a code of taxonomy. Onomatophores are indeed very important vouchers for the whole of evolutionary biology, and museums and other collections caring for their preservation in good conditions play a major role in our understanding of biodiversity.

In the recent years, several zoological species were described as new without deposition of reference specimens in collections, because these species were considered by their discoverers too endangered to allow collection of even a single specimen without increasing their risk of extinction. Examples include the bird *Laniarius liberatus* (Smith *et al.* 1991) and several primates: the mangabey *Lophocebus kipunji* (Jones *et al.*

2005), later made the type of a new genus (Davenport *et al.* 2006); the lemur *Avahi cleesei* (Thalmann & Geissmann 2005); and the capuchin *Cebus queirozi* (Mendes Pontes *et al.* 2006). These cases have been in the center of a contentious debate on the need for keeping dead specimen holotypes for establishing the nomina of new animal species. Whereas some authors (Timm *et al.* 2005, Landry 2005, Oliveira & Langguth 2006) stated that the nomina of these taxa, if published after 1999, are nomenclaturally unavailable, others (Wakeham-Dawson *et al.* 2002, Polaszek *et al.* 2005) defended the opposite idea. Similar situations, although in these cases not caused by threats on the species but on "rarity" of species and difficulties in collecting them, were recently encountered in several cases of descriptions of new species based on DNA sequences only, without onomatophores, for example in whales (Dalebout *et al.* 2004, and references therein), and these cases were also taken as flag examples for a plea for "modern" nomenclature that could supposedly be "freed" from the constraint of depositing dead specimens in collections (Dalebout & Baker 2002): "Due to the declining abundance of many species, access to complete anatomical specimens is becoming a vanishing luxury. (…) For many animal taxa, the lethal collection of such voucher specimens would now also be considered unethical." (Dalebout *et al.* 2004: 459).

Interestingly, this new trend meets another recent one in biological nomenclature, illustrated by the promoters of nomenclatural systems alternative to the current codes, where allocation of nomina to taxa is not based on onomatophores but on so-called "phylogenetic definitions". As discussed in detail elsewhere (Dubois 2005, 2006b), a basic problem (among others) of such nomenclatural systems is that they miss the material connexion between language and specimens realized by onomatophores.

Our aim in this paper is to explore again this question in the light of the current *Code* and of other considerations.

Nomenclatural availability of nomina

Dubois (2005) distinguished three steps in the nomenclatural process required to establish the valid nomen of a taxon in zoology under the Rules of the *Code*: *availability* of nomen (through publication and respect of precise criteria), *allocation* of nomen to taxon (through onomatophore) and *validity* of nomen (through priority). These three "floors of the nomenclatural house" must be explored successively. Regarding the first floor, availability, Dubois (2000) recognized two categories of nomina: ***hoplonyms*** are nomina published through respect of all *Code*'s criteria of nomen availability, whereas ***anoplonyms*** are nomina published but not respecting all these criteria, and therefore nomenclaturally unavailable (i.e., "non-existent" in zoological nomenclature). Criteria of availability are mostly described in Chapter 4 (Articles 10 to 20) of the *Code*, but also in Chapter 1 (Articles 1 to 3) of the latter. The term ***nomen nudum*** (***gymnonym*** in Dubois 2000) designates only a subcategory of the category of anoplonym, as the "Glossary" of the *Code* (p. 111) defines it as a nomen "that, if published before 1931, fails to conform to Article 12; or, if published after 1930, fails to conform to Article 13". To be an anoplonym, a nomen just has to fail to conform to any of the Articles 1–3 and 10–20, so this covers a much wider array of cases than the category of ***nomen nudum***.

It is important to realize that the Rules for nomen availability have changed through time, and these Rules nowadays are much more stringent than in the past. Today, practising taxonomists are following these Rules, not those of the past. Importantly, Article 16 is new, and it introduces important changes compared to the previous edition of the *Code* (Anonymous 1985). Let us review the Rules of the *Code* regarding nomen availability.

Chapter 1 ("Zoological nomenclature") provides general Rules for admissibility of nomina covered by the *Code*: nomina failing to conform these Rules are therefore anoplonyms. Article 1.1 states that zoological nomenclature only covers nomina applied to taxa of extant or extinct animals, which excludes oganisms referred to other kingdoms. Article 1.3 expressly excludes from zoological nomenclature several categories of nomina, in particular proposed "for hypothetical concepts" (Art. 1.3.1) or "after 1930, for the work of extant animals" (Art. 1.3.6). The "Glossary" of the *Code* (p. 101) defines "hypothetical concept" as follows: "A taxonomic concept that when published contained no animal then known to exist in nature, past or present, but only in the mind of the author whether a prediction or not". This sentence is strangely written, as a concept cannot "contain" an animal, but "refer to" or "designate" it. The French version of the "Glossaire" (p. 235) proposes a more accurate definition of "concept hypothétique", as it mentions that such a concept "n'est pas basé sur un animal (...)" ("is not based on an animal"). Article 3 excludes from zoological nomenclature all nomina and nomenclatural acts published before 1758.

Chapter 4 ("Criteria of availability") lists all criteria which must be met for a nomen to be available in zoological nomenclature. For the purpose of the present discussion, we will briefly survey most of these conditions and only outline a few of them. Articles 10 and 11 present general conditions of availability, in particular regarding the need of publication and the formation of nomina. Article 12 presents special requirements that only apply to nomina published before 1931: any such nomen "must be accompanied by a description or a definition of the taxon that it denotes, or by an indication" (Art. 12.1), and Art. 12.2 defines precisely the meaning of the term "indication". Article 13 concerns nomina published after 1930, and requires that they "be accompanied by a description or definition that states in words characters that are purported to differentiate the taxon", or refers to such a published statement, or be proposed as a *nomen novum* (*neonym* in Dubois 2000) for an already available nomen. Article 14 excludes from zoological nomenclature nomina published anonymously before 1950, and Article 15 excludes nomina published conditionally, or for taxa given the ranks "variety" or "form", after 1960. Articles 17 to 20 provide special Rules concerning availability of nomina in a few particular situations (e.g., nomina applied to taxa of hybrid origin, tautonymous nomina or subsequent spellings of nomina).

All the preceding articles existed, in similar or slightly different forms, in the past editions of the *Code* until the so-called third one (Anonymous 1985), and none of them mentioned the need, for availability of nomina, of the existence of an onomatophore (holotype, syntypes, lectotype or neotype). However, an important change was brought to the *Code* in Article 16 of the fourth edition (Anonymous 1999), which added several requirements for availability of nomina published after 1999. These new requirements include the need of an explicit statement of the intention to establish a new nominal taxon, the need to mention the type genus of a new familial nomen, and, above all, the need of fixation of the onomatophore for any new specific or subspecific nomen. As this part of Article 16 will be in the center of the discussion below, it is better to provide a large quote of it, including some of its Recommendations:

"16.2. **Family-group names: type genus to be cited.** (...) a new family-group name published after 1999 must be accompanied by citation of the name of the type genus (...).

16.4 **Species-group names: fixation of name-bearing types to be explicit.** Every new specific and subspecific name published after 1999, except a new replacement name (a nomen novum), for which the name-bearing type of the nominal taxon it denotes is fixed automatically (...), must be accompanied in the original publication

16.4.1 by the explicit fixation of a holotype, or syntypes, for the nominal taxon (...), and,

16.4.2 where the holotype or syntypes are extant specimens, by a statement of intent that they will be (or are) deposited in a collection and a statement indicating the name and location of that collection (see Recommendation 16C).

Recommendation 16C. Preservation and deposition of type specimens. Recognizing that name-bearing types are international standards of reference (see Article 72.10) authors should deposit type specimens in an institution that maintains a research collection, with proper facilities for preserving them and making them accessible for study (i.e. one which meets the criteria in Recommendation 72F).

Recommendation 16D. Publication of information distinguishing type specimens. When providing information to distinguish the type specimen(s) from other specimens (Article 16.4.1) authors should include information such as specimen numbers and descriptions of labels (see Recommendations 73C and 73D for data recommended).

Recommendation 16E. Preference for holotype over syntypes. Whenever possible, authors should select a holotype rather than syntypes.

Recommendation 16F. Illustrations of type specimens. Whenever possible a holotype or syntypes should be illustrated, showing characteristic features of the taxon, in the work in which the new nominal taxon is established."

Also relevant for this discussion are the following Articles:

"72.2. **Fixation of name-bearing types from type series of nominal species-group taxa established before 2000.** A nominal species-group taxon established before 2000 may have its name-bearing type fixed from the type series (...) originally (...), or subsequently (...). (If no name-bearing type is believed to be extant a neotype may be fixed; see Article 75 for conditions).

72.3. **Name-bearing types must be fixed originally for nominal species-group taxa established after 1999.** A proposal of a new species-group taxon after 1999 (unless denoted by a new replacement name (nomen novum) (…), must include the fixation of a holotype (...) or syntypes (...). In the case of syntypes, only those specimens expressly indicated by the author to be those upon which the new taxon was based are fixed as syntypes.

(...)

72.5. **Eligibility as name-bearing types.** Only the following are eligible to be a name-bearing type, or part of a name-bearing type, or a nominal species-group taxon:

72.5.1. an animal, or any part of an animal, (...);

72.5.6. In the case if a nominal species-group taxon based on an illustration or description, or on a bibliographic reference to an illustration or description, the name-bearing type is the specimen or the specimens illustrated or described (and not the illustration or description itself).

(...)

72.10. **Value of name-bearing types.** Holotypes, syntypes, lectotypes and neotypes are the bearers of the scientific names of all nominal species-group taxa (and indirectly of all animal taxa). They are the international standards of reference that provide objectivity in zoological nomenclature and must be cared for as such (...). They are to be held in trust for science by the persons responsible for their sage keeping.

Recommendation 72D. Labelling of name-bearing types. Holotypes, syntypes, lectotypes and neotypes should be labelled in a way that will unmistakably denote their status.

Recommendation 72E. Publication of information on labels. An author who designates a holotype, lectotype, neotype or syntypes should publish all information that appears on the labels accompanying the specimens so as to facilitate the future recognition of the specimens.

Recommendation 72F. Institutional responsibility. Every institution in which name-bearing types are deposited should

72F.1 ensure that all are clearly marked so that they will be unmistakably recognized as name-bearing types;

72F.2 take all necessary steps for their safe preservation;

72F.3 make them accessible for study;

72F.4 publish lists of name-bearing types in its possession or custody; and

72F.5 so far as possible, communicate information concerning name-bearing types when requested.

(...)

73.1. **Holotypes.** A holotype is the single specimen upon which a new nominal species-group taxon is based in the original publication (...).

73.1.1. If an author when establishing a new nominal species-group taxon states in the original publication that one specimen, and only one, is the holotype, or 'the type', or uses some equivalent expression, that specimen is the holotype fixed by original designation. (...)

73.1.4. Designation of an illustration of a single specimen as a holotype is to be treated as designation of the specimen illustrated; the fact that the specimen no longer exists or cannot be traced does not of itself invalidate the designation. (...)

Recommendation 73C. Data on the holotype. An author who establishes a new nominal species-group taxon should publish at least the following data concerning the holotype, if they are relevant and known to the author: (...)

73C.6 the collection in which it is situated and any collection number or register number assigned to it; (...)"

Changes in the *Code* regarding the nomenclatural function of onomatophores

Before discussing the problem addressed by the papers mentioned above, it is useful to clarify the nomenclatural function of onomatophores ("name-bearing types"). One often reads that these specimens "provide objectivity in zoological nomenclature" (e.g., Art. 72.10 of the *Code* quoted above). This is true, but needs more precise qualification. The function of these specimens is not, as some have construed it (e.g., de Queiroz & Gauthier 1990, 1994; Pennisi 2001; Joyce *et al.* 2004; Sluys *et al.* 2004), to provide *characters* that would allow to *define* the taxon to which the nomen is applied: this would rely on a typological conception of taxonomy which is outdated and that few recent taxonomists would support (Dubois 2005). The definition of taxa is not a matter of nomenclature but a matter of taxonomy, and the *Code* does not deal with taxonomy but with nomenclature. The *Code* does not provide rules or guidelines for defining taxa, but Rules for naming taxa once they have been defined. To avoid such basic confusion, extirpation of the term "type" of its derivatives from the vocabulary of nomenclature would be useful (Dubois 2005) and this is why we here use the term *onomatophore* (Simpson 1940) for "name-bearing type" in the *Code*.

The main role of onomatophores under the *Code* is to provide an objective connexion between the world of specimens (and, through them, of natural populations of organisms) and the world of language (Dubois & Ohler 1997a–b). It allows allocation of a nomen to a taxon or several taxa. A given nomen applies potentially to any taxon that includes its onomatophore — in fact, it only applies to a single taxon or a few taxa, because of the existence of several nominal-series and of the Rule of Coordination (for details see Dubois 2006b and submitted-a) — and that is all. This function of onomatophore (bearing the nomen) pertains in the second floor of the nomenclatural house (nomen allocation) and has nothing to do with availability of nomen. Until 1999, no Rule existed requiring the designation of an onomatophore for availability of a nomen, and Rules allowed subsequent fixation of onomatophores for nominal-taxa first created without onomatophores (at least in the species and genus nominal-series). The 1999 edition of the *Code* introduced a new function for onomatophores, in requiring their designation for a nomen to become available. This is an important change, highly welcomed by taxonomists (see below), but which does not imply that onomatophores, as such, are used to provide the characters of the taxa denoted by the nomina. "As such" means that, beside their nomenclatural function of onomatophores, the same specimens, which are part of what the *Code* calls the series of "type specimens", but which is better designated as the *hypodigm* (Simpson 1940, Dubois 2006a), also have a taxonomic function, which is to provide characters that will be used to build up a taxonomy (nowadays often through the formulation of a phylogenetic hypothesis).

In the 1985 *Code*, explicit designation of an onomatophore was compulsory for nomen availability only for nomina of the genus-series, as Article 13.b required that such a nomen created after 1930 "be accompanied by the fixation of a type species". The 1999 *Code* is much more consistent in this respect, as its Article 16.2 requires that new family-series nomina created after 1999 "be accompanied by citation of the name of the type genus", and its Article 16.4 provides a similar Rule for species-series nomina (see below). Such Rules are nd most welcome, because they clearly point to the Principle of Onomatophores as the basic prin- e for allocation of nomina to taxa in the *Code*. This is a major difference with other nomenclatural systems those supported by proponents of various systems of "phylogenetic nomenclature", and this is the main reason why both kinds of nomenclatural systems are incompatible and cannot be "reconciled" or "mixed" as suggested by some (e.g., Kuntner & Agnarsson 2006). This is also the major reason for superiority of the *Code* over these alternative systems, as it maintains a permanent link between specimens and nomina and is therefore not an internal system within language, and as it allows nomenclature to remain theory-free regard- ing taxonomy, and therefore liable to adapt to new taxonomic paradigms that might develop in the future (Dubois 2005 and submitted-a).

For the availability of nomina, the last edition of the *Code* now requires "fixation" of onomatophores. "Fixation" means that, to be available, a new nomen must have been created *associated with the fixation or designation* of a holotype or syntypes. By itself, this statement simply requires this *designation*, but not clearly that the onomatophore be *preserved* after designation and description, as will be discussed below.

Why was this important change brought to the *Code*? No explanation was provided in this respect in the "Introduction" of this edition (Ride 1999), although this text spent space tackling other minor questions or points that were not yet in order at the time of its publication (such as the eventuality of "replacing 'publication' as a primary determinant of availability", a very questionable idea indeed). We can see two immediate reasons for supporting this major change: (1) requiring the designation of onomatophores avoids the introduction into nomenclature of nomina based on "hypothetical concepts", as defined above; (2) it avoids the creation of "phantom nomina", as defined by Vences *et al.* (1999). These points will be further clarified and discussed below, but it should be clear already that, if these two reasons are indeed behind the change in this article of the *Code*, simple consistency would require that onomatophores be not only designated but also preserved, as otherwise none of these two problems would be solved.

As a matter if fact, there is an apparent contradiction between Articles 16.4.1 and 16.4.2 of the new *Code*. Article 16.4.1 requires the *explicit fixation* of an onomatophore for any new species-series nomen to be available. A common sense interpretation of this Rule is that this fixation of the onomatophore must always be followed by its deposition in a public collection, all the more that Article 72.10 states that such specimens are "international standards of reference" that "are to be held in trust for science". This would mean that nomina created on the basis of an illustration, without real specimen, would be anoplonyms if published after 1999. However, this interpretation is not straightforward. Article 16.4.2 starts with the words "where the holotype or syntypes are extant specimens" — which means that they may *not* be extant specimens, and therefore may *not* be deposited in a collection. Polaszek *et al.* (2005: 2165) recognized that the current wording of Article 16 of the *Code* is ambiguous and should be made clearer, since they wrote: "The well-intentioned reactions of Landry and Timm et al. show that the current Code is open to different interpretations on the subject of type specimens". What can be these "different interpretations"?

According e.g. to the *Oxford Dictionary* (Thompson 1995: 476) "extant" means "still existing", and the "Glossary" of the *Code* (p. 104) also defines it as "still in existence". The first part of Art. 16.4.2 thus suggests that the holotype or syntypes may not be still in existence without impeding nomenclatural availability. There seems to be three possible reasons why it could not be the case: (R1) the specimen was examined by the describer, then killed, fixed and deposited in a collection, but later destroyed, lost or misplaced, so that it had disappeared at the time of publishing the description; (R2) it was examined alive by the describer, but then escaped or was set free before publication of the description; (R3) it was described only from indirect evidence (drawing, photograph, description, traces, etc.), but it has never been in the hands of the describer. The first case (R1) must be extremely rare in the case of nomina created after 1999, as it is unlikely that a specimen was killed, deposited in a collection, and destroyed or lost just after, before publication of the description, in a period of a few years. In contrast, both the second and third possibilities may apply to nomina created after 1999 and covered by Article 16.4.2 if the current *Code*.

Polaszek *et al.* (2005) and others interpreted this article as meaning that a species can be named without depositing an onomatophore in a collection. This interpretation (I1) is supported by Article 73.1.4, which states that, even after 1999 (as no mention of a limiting date is made in this article), an illustration may be designated as onomatophore of a new taxon, and that "the fact that the specimen no longer exists or cannot be traced does not of itself invalidate the designation". With this interpretation, the mention of the possibility to create a new nomen without "extant specimen" almost amounts to a return to the situation before 1999 and largely nullifies the progress introduced in the *Code* by Article 16.4.1. It still allows nomina to be created entirely within language, without objective reference to specimens, and is therefore a half-way measure which seems questionable. Under this interpretation, the post-1999 nomina mentioned above (*Lophocebus kipunji*, *Avahi cleesei* and *Cebus queirozi*) are hoplonyms (nomenclaturally available).

However, another interpretation (I2) of this article is possible. Under this reading, the case (R3) above would be acceptable, but not the case (R2). In the latter situation, the species was described on the basis of a living, therefore then "extant" specimen, and Article 16.4.2 would therefore require its deposition in a collection, or statement of intent of such a deposition. Under such an interpretation, it is not acceptable to release this specimen free, as this would contravene the dispositions of this article. Therefore, description of a new species based on a living specimen would allow availability of nomen only if the specimen is, or will later be, deposited in a collection. Under this reading of the *Code*, the latter would give no license to release a holotype after capture, description, photograph and possibly taking off a sample of blood, feather or hair for DNA analysis. If this is accepted, the three nomina listed above (and others in the same situation) are anoplonyms (nomenclaturally unavailable).

As recognized by Polaszek *et al.* (2005), the current writing of Article 16 does not allow by itself to choose between these two interpretations. The choice by Wakeham-Dawson *et al.* (2002) and Polaszek *et al.* (2005) of interpretation (I1) seems to be based on two widely different elements. The first one is Article 73.1.4, which, as mentioned above, allows designation of a figured specimen as onomatophore without limiting date (i.e., even after 1999). If interpretation (I2) was considered valid, then Articles 16 and 73 would be in contradiction. The second element is the fact that interpretation (I1) is supported by current and past members of the International Commission on Zoological Nomenclature ("the Commission" hereafter), including its current (Andrew Polaszek) and preceding (Philip Tubbs) Secretaries, so it would seem to correspond to the "intention" of the authors of the current edition of the *Code*, who did not wish to make deposition of a holotype in a collection compulsory for nomen availability. However, when "juridical" texts like the *Code* are concerned, the intention of the draftsmen is of little importance, what counts is the final text. The current text being ambiguous, it should be clarified in the next edition of the *Code* by adding some precisions. It can be so in two different directions.

If the aim is to support interpretation (I1) above, a single change is required: (C1) a second part should be added at the end of Article 16.4.1, stating that "this or these specimen(s) may be extant or not".

If the aim is to support interpretation (I2) above, three changes should be brought to the present *Code*. (C2) Article 16.4.1 should be written as follows (or an equivalent writing): "by the explicit fixation of one or several extant specimen(s) as holotype or syntypes ..."; (C3) the first 8 words of Article 16.4.2 should be suppressed and this article should start with "by a statement..."; (C4) Article 73.1.4 should start with the words (or equivalent): "For nominal taxa created before 2000".

Until changes are brought to the current writing of the *Code* in either of these two directions, the ambiguity described above will remain, but as the current officers of the Commission are not in favour of forbidding description of a new species without an onomatophore, they are likely to "impose" their interpretation to the international community of taxonomists. Under this interpretation, there is no contradiction between Articles 16 and 73, whereas under the interpretation (I2) these two articles are not consistent, and one of them, at least, should be changed.

Thus, under interpretation (I1), favored by the Commission, the current *Code* allows to create a new nomen without an extant specimen, especially if an illustration of this specimen exists. Is such a Rule indeed appropriate? Let us explore this question in more detail.

Illustrations as onomatophores

In botanical nomenclature (McNeill *et al.* 2006), the onomatophore of a specific or infraspecific nomen can be either a specimen or an illustration (Art. 8.1). In the latter case, the botanical code makes it quite clear that the onomatophore is the illustration, not the specimen shown by the latter, although it is recommended to go back to material specimens for nomen allocation: "When a holotype, a lectotype, or a neotype is an illustration, the specimen or specimens upon which that illustration is based should be used to help determine the application of the name" (Art. 8.1). Such Rules have an important consequence: as the illustration itself is the onomatophore, the fact that the specimen on which the illustration was based is now lost does not allow to designate a neotype for the taxon.

The situation is different in zoology. According to the Rules of the current *Code*, the status of illustrations as basis for the creation of new zoological nomina depends on the date of publication. For nomina published before 1931, one possible "indication" that can be used to make them available is defined as follows in Article 12.2.7: "the proposal of a new genus-group name or of a new species-group name in association with an illustration of the taxon being named, or with a bibliographic reference to such an illustration". Therefore, before 1931, a new nomen could be created even without a verbal description or definition of the taxon for which it was intended. This is no more possible after 1930, as after that year Article 13.1.1 requires that a nomen "be accompanied by a description or definition". However, in this article it is not stated that an author must have had a specimen in the hands to write a description or indication, and the latter may well have been prepared on the basis of an illustration. The new Article 16 does not suppress this possibility. It just requires an explicit fixation of an onomatophore, but not clearly that this specimen be "an extant specimen". This is further confirmed in Article 73.1.4 copied above.

There is a basic difference between the botanical and zoological codes as concerns the status of illustrations as onomatophores. In contrast with the botanical code, the zoological code makes it clear that the onomatophore is the specimen(s) figured, not the illustration itself. This has an important consequence regarding the situation, which is rather common when old illustrations are concerned, where the specimen(s) used as a basis for the illustration is/are now lost or destroyed. In such a case, the onomatophore is no longer extant, which opens the possibility to designate a neotype for the taxon if the conditions of Article 75.1 are met, i.e., when "an author considers that a name-bearing type is necessary to define the nominal taxon objectively". This is a very useful particularity of the *Code*. In particular, it allows to settle at best the nomenclatural status of nomina created in old works on the basis of syntypes consisting in several specimens and/or illustrations, especially when these were of different origins and likely to belong in different taxa. One possible procedure in such cases, used e.g. by Kottelat & Lim (1993), Dubois & Ohler (1995) and Kottelat & Persat (2005), and illustrated and explained in detail in Dubois & Ohler (1997a–b), is to solve the ambiguity attached to the nomen by a nomenclatural action involving two distinct steps: first, to designate as lectotype one of the specimens figured, which can allow for example to restrict the type-locality of the taxon and to eliminate the other syntypes from the onomatophore; and then, taking advantage of the fact that this specimen is no more extant, to designate a neotype from the same locality.

So, despite its new Article 16.4.1, the current *Code* still apparently leaves open the possibility to create a new nomen on the basis of an onomatophore shown in an illustration but not available nowadays for study, i.e., a virtual or missing specimen. Clearly, some authors are in favour of this system, and others not. Let us consider the pros and cons of this system.

Arguments for and against basing nomina on virtual or missing specimens

Favourable arguments

(1) The conservation issue

The first argument in favour of accepting availability of nomina even in the absence of extant onomatophore deposited in collections is of course the "conservation" one. It does not seem adequate to collect and kill even a single specimen of a species that, at the very moment of its discovery, appears to be on the verge of extinction. This reason was given by the authors of the primate and bird nomina mentioned above to describe these species without material onomatophores.

This argument in fact contains two different aspects. The first one is that it is genuinely believed by these biologists that capturing and fixing even a single specimen of such species may indeed have a major impact on the survival of the latter. This will be further discussed below. The second one is in fact quite distinct: it is that killing a specimen of such an endangered species would certainly not be understood by conservationists and more largely by "the public". Such a behaviour would appear "irresponsible" to these people, and, above all, would contribute to give a bad image of taxonomists to outsiders of the discipline of taxonomy. As the latter is already poorly understood and appreciated among biological sciences, and, by way of consequence, severely underfunded and much too short in professional positions (Dubois 2003, Wheeler *et al.* 2004), any action that might contribute to undermine its image should be avoided by all means. Although they rarely state it clearly, this second motivation might be more important than the first one for taxonomists who decide to describe new species without fixed specimens.

(2) The difficuty or impossibility of collecting or conserving specimens

Some material reasons may make it very difficult or virtually impossible to collect or preserve specimens of a new species. This is in particular the case of some marine organisms, especially of very large size (such as some cephalopods or cetaceans) or living in deep habitats. Some of these organisms may be observed and photographed, e.g. from a deep-sea submersible, but not collected. Should taxonomy be deprived from dealing with such organisms because taxonomists cannot have them in the hands? In such cases, it could appear that naming such taxa on the basis of photographs alone is justified. This point will be discussed further below.

A related case would be that of organisms which for some reason, after collection, cannot be conserved in such a way as to allow their subsequent study. However, this case seems to be mostly a theoretical possibility as, although some organisms are more difficult than others to fix and conserve properly, it is usually possible to find appropriate, even if unusual, modes of conservation for them.

(3) Descriptions based on ancient illustrations

This case might be the most convincing one for the formal description of species without having actual specimens in hands. Ancient iconographic documents are sometimes used by some taxonomists to provide evidence that the specimens which were used to produce these illustrations belonged indeed in unknown, or at least undescribed and unnamed, zoological species. This may even in some extreme cases be possible using solely descriptions in words, without illustrations, when these descriptions are detailed enough, and apparently accurate enough, to warrant such conclusions.

A good example of this situation is the formal description and naming by Bour (1978) of a new tortoise from the Mascarene, based on illustrations published in 1737 that were precise enough to allow ascertaining the diagnostic characters of this species, which had become extinct around 1840 as a result of man's exploitation (Bour 1984), and which was until then known only by imprecise descriptions of travellers. Interestingly, this description prompted the discovery of subfossil remains of the same species, which allowed a more complete redescription (Bour 1979), and later to show that this species was in fact the one that had been originally named *Testudo indica* Schneider, 1783 on the basis of a holotype, still extant, but which had been considered for two centuries of unknown origin (Arnold 1979, Austin *et al.* 2002). Such exceptional discoveries will no doubt remain possible in the future, and it certainly would not be appropriate to forbid the naming of such species because no specimen is available.

Unfavourable arguments

(1) Hypothetical concepts

The *Code* expressly excludes from its domain nomina proposed for animals not known with certainty to exist or to have existed in nature, "but only in the mind of the author whether a prediction or not". This definition may seem clear, but needs further information to become operational. The only way to be sure that an animal does not exist only in the mind of a person is to be able to examine a specimen. Such nomina can well be "defined", even "phylogenetically", but they may not correspond to any organism in the real world. A striking example is provided in a paper where many hypothetical groups of amphibians were defined (Lescure *et al.* 1986), based on phylogenetic hypotheses that were not supported by subsequent works (Nussbaum & Wilkinson 1989), so that these taxa fully correspond to the notion of "hypothetical concept" as defined in the *Code*.

As discussed below, a photograph by itself cannot be used as an objective proof of the existence of an animal, and a verbal description or a testimony, even if supported by several witnesses, cannot qualify as a scientific evidence, for several reasons spanning from observations that are inaccurate (although honest) due to various material reasons, to deliberate falsification or pure invention. Good examples of such problems are those posed by the various "mythical animals" that have been "seen", sometimes by many "witnesses", but for which material evidence is still missing, such as the abominable snowman and its avatars (yeti, migu, barmanu, sasquatch, etc.), the Loch Ness monster and various "sea snakes" and other marine monsters. Most of these stories are purely verbal, but some "material documents" indeed exist, such as "photos" of the Loch Ness monster or of the sasquatch, or recordings of the voice of the Caucasian barmanu, which all have in comment to be of "bad quality" (photos out of focus, recordings with noisy background, etc.).

In a few cases, Latin nomina were indeed proposed for such "animals", despite the absence of specimens, but on the basis of testimonies, descriptions, traces such as footprints, hair or "scalp", or even photographs. An interesting case is that of the "iceman" formally described and named *Homo pongoides* on the basis of a specimen purported to have been examined through ice in an itinerant circus, but which later "disappeared", and for which several photographs and drawings were published (Heuvelmans 1969, Heuvelmans & Porchnev 1974). What can science do with such "descriptions" and nomina? How can the criterion of Article 1.3.1 for exclusion of "hypothetical concepts" be applied? Is the nomen *Homo pongoides* a hoplonym or an anoplonym, and, if it is a hoplonym, what is its status? Valid nomen, synonym, *nomen dubium*? If deposition of a specimen in a public collection was compulsory for availability of new nomina, such a question would not be raised, and formal description would have to await capture of a specimen or discovery of remains attributed to this "taxon".

(2) Phantom nomina

This concept was coined by Vences *et al.* (1999) for new nomina "accidentally" published without proper descriptions and identified vouchers in amateur publications or animal shop catalogues dealing with animal groups that attract many hobbyists (in their case brightly colored frogs of the genus *Mantella* Boulenger, 1882), on the basis of photographs of live specimens later sold to customers. These authors discussed the major problems posed by the proper allocation of such nomina to taxa, then wrote: "editors of hobbyist journals should not permit their authors usage of new scientific names to name undescribed or undetermined mor-phs unless the names are accompanied by a formal description and type specimens are deposited in a publicly available scientific collection" (Vences *et al.* 1999: 56). For many taxonomists who work on such "attractive" animal groups (e.g., insects, molluscs or vertebrates kept alive by aquariophilists and terrariophilists), the new edition of the *Code* was received with relief, as the common sense interpretation of the new Rule of Article 16.4.1 is that it now imposes the deposition of onomatophores in public collections for new nomina to be nomenclaturally available. But as this interpretation is not supported by Articles 16.4.2 and 72.5.6, nor by officers of the Commission, taxonomists working on such groups should remain vigilant and expect new problems similar to those described by Vences *et al.* (1999).

(3) Photographs as scientific evidence

There is a widespread but unfounded belief that photographs are "better scientific evidence" than mere written descriptions or even drawings or paintings. There are several reasons why this belief is unfounded. First, photographs have always been liable to be falsified, and faked photographs have indeed been used in many occasions, from political propaganda to commercial or juridical affairs, including science. A recent example in zootaxonomy concerns the new species of coelacanth from Indonesia described as *Latimeria menadoensis* (Pouyaud *et al.* 1999), but for which shortly after a faked photograph was submitted for intended publication in *Nature* (McCabe & Wright 2000). Nowadays, with digital photographs, faking has become even easier and virtually undetectable, and photographs should not be considered reliable proofs by themselves for anything. Faking is also possible with specimens, of course, but such falsifications, whether simple hoaxes or intended to promote particular ideas or to support a personal's carrier, are usually discovered later on by careful examination of the material, as was the case, e.g., for the "Piltdown man" (Weiner *et al.* 1953), but such deceptions may be more difficult to demonstrate with digital photographs.

But faking is not the only reason why photographs are not the best way to know the characters of biological species. Characters are not "facts" that would not depend on the subjectivity of observers. They are interpretations of reality, usually based on a given "reading" by man of the phenotypes of organisms. They depend on scientific judgements and decisions concerning homology, similarity and difference. In this respect, descriptions using words, or scientific drawings, are more informative, because they highlight some features and ignore others, that are considered of no or little relevance for the characterisation of a taxon. In contrast, the implacable objectivity of photographs, which capture in the same manner basic and "meaningless" characters of the specimens, or even sometimes artificial details such as shadows and lights — except, once again, if photographs are modified to show special features, but then we come back to the problem above —, does not provide as much help to taxonomists.

Even with the best goodwill, study of photographs for taxonomic work implies the risk of misinterpreting some characters, of missing others, and sometimes of "inventing" still others. An enlightening example of the latter situation is provided by the recent decription of the new taxon *Torquerator bullocki* (Holland *et al.* 2005). This organism belongs in a group of deep-sea hemichordates that were known from photographs but had not been previously collected. On the basis of the interpretation of the photographs taken by submersibles, where these worms appeared to have collar tentacles, these organisms had been considered a missing link (the so-called "lophenteropneusts") between two main hemichordate body plans, the enteropneusts and the pterobranchs (Lemche *et al.* 1976), and this in turn had influenced ideas about the origin of vertebrates. Collection and study of a specimen of this group showed that these interpretations were wrong: "The collar, although disproportionately broad, lacks tentacles. In addition, we find no evidence of tentacles in the available deep-sea photographs (published and unpublished) of broad-collared enteropneusts, including those formerly designated as lophenteropneusts. Thus, the lophenteropneust hypothesis was based on misinterpretation of deep-sea photographs of low quality and should no longer be used to support the idea that the enteropneust body plan is basal within the phylum Hemichordata." (Hammond *et al.* 2005: 374). In this case, it is therefore fortunate that Lemche *et al.* (1976) were prudent enough not to publish a formal description and naming of these organisms on the basis of photographs alone, as the Latin nomina that could have been created for this purpose would have turned out to be anoplonyms, being based in fact on "hypothetical concepts". In fact and more exactly, they wrote that the nomen Lophenteropneust was "intended to cover a group above the family level and thus no subject to the rules of nomenclature" (Lemche *et al.* 1976: 292), so that if in the future class-series nomina are incorporated into the *Code* (Dubois 2006a) the status of this nomen will have to be settled.

There is no need to turn to deep-sea organisms to encounter problems with descriptions of new taxa based only on photographs. Examples of such problems, discussed by Pauwels & Meirte (1996) and Pauwels & Chérot (1997), include the description of the "Loch Ness monster" as *Nessiteras rhombopteryx* by Scott & Rines (1975), that of *Cryptophidion annamense* by Wallach & Jones (1992) and that of *Cadborosaurus willsi* by Bousfield & Leblond (1995). These cases, and several other ones, belong in the domain of "cryptozoology", a pseudo-science created by Bernard Heuvelmans on the basis of a misunderstanding, because he thought that onomatophores were required by the *Code* for description of new zoological taxa (Pauwels & Chérot 1997): in fact, they were not then, but the problems created by such descriptions led many zoologists to hope that the fourth edition of the *Code* would require the designation of an onomatophore and its deposition in a collection for nomen availability. In the absence of such a Rule, it is formally impossible to exclude from zoological nomenclature some extreme cases of "hypothetical concepts" described as new taxa. Thus, the description by Quintart (1989), as *Marsupilami franquini*, of the marsupilami, an imaginary animal created in cartoons by Franquin, was recorded in the *Zoological Record*, and there is no reason why the Rhinogradentia, imaginary organisms described with extravagant details by an imaginary professor (Stümpke 1962), should not be so!

(4) Alive specimens as onomatophores

In the recent years, some new species were described with live holotypes, maintained in captivity in zoos or vivaria. Although zoological gardens can be considered as a special kind of "collections", keeping live instead of dead animals, their status is quite distinct from collections of museums, for several reasons. First, as long as it is alive, a specimen may escape and disappear forever. It may also die, and its death may not be noticed immediately by the responsibles of its keeping: it may then be eaten, entirely or partly, by other captive animals, including "preys" provided for its feeding (crickets will rapidly eat a frog specimen after its death in a vivarium), it may desiccate or putrefy, etc. Even if found rapidly, in many cases, such a holotype will often not be as well fixed as a specimen killed and fixed carefully for proper subsequent study. Thus, even if the "intention" to fix and keep the specimen in a museum collection after its death is announced, for example in giving it already a collection number even before its death (e.g., the holotype of *Varanus melinus*, see Böhme & Ziegler 1997), this intention may not be fulfilled later on.

What can be the reasons for keeping a holotype alive instead of killing it before description of the new taxon? One of them may be to obtain its reproduction in captivity, which may be all the more desirable as the species is rare and endangered. This can be a good reason only in some cases: specimens of both sexes must be available (in taxa with separate sexes), and breeding must be feasible in captivity. These conditions are not always met, far from that. Other reasons may be to do ethological observations on this specimen in captivity, or simply to show the animal to the public (which is usually the case in zoos). No need to say, in many cases (e.g., in mammals and birds), behaviour in captivity is widely different from behaviour in the field, and the information that will be so obtained will be of little help to know the species better. The question should therefore be asked in all such cases: is the potential benefit that can be derived from keeping the specimen alive worthy of talking the risk to see this specimen escape, or be eaten or injuried by others, or desiccated or rotten, instead of having a well-fixed holotype in a nice position allowing good morphological studies? In many cases, the answer to this question will be "no". But then we come to another problem, the real "mawkishness" of many zoologists nowadays, which results in a number of them been simply reluctant to kill animals, for so-called reasons of "ethics". This problem is explored further below.

The conservation issue

Let us come back here to the conservation issue, in a different perspective from that presented above. If a species is found so critically threatened by extinction that the collection of a single individual would be a risk, then it is quite possible, not to say very likely, that this species will not survive long in nature due to obvious reasons of population dynamics and genetics. In this situation, what is ethical? To allow the species become extinct without documenting the loss? On the contrary, isn't it then an ethical responsibility of zoologists to keep at least one specimen in a museum to document the existence of a species which became extinct during modern times, in most cases as a result of human action? From a scientific point of view, this course, documenting the biological information on diversity, is certainly preferable to that consisting in leaving this species become extinct without keeping a single material testimony of its existence for future generations of biologists. Then, if a species is threatened by extinction, it is *an additional argument* to keep a specimen in a museum, not to the contrary.

It is quite likely that "extreme conservationists", and even perhaps most "conservationists", will not agree with the statement above. They will probably say that, as long as a species has "a chance" to survive, it should be left this chance. Some of them would certainly even push this argument further, and suggest that, even when only one specimen of an undescribed species remains alive, and has no possibility to leave an offspring, it should be left alone, free and untouched — whereas a responsible taxonomist would certainly think that this specimen should be either immediately killed and fixed, or kept carefully in captivity for preservation at its death. We are in fact here in front of *genuinely different* approaches to species extinctions on our planet. Many conservationists think that conservation should be the first priority in all cases, even when the chances of recovery of the species are very weak or null, and even when this attitude threatens the possible obtention of basic biological information on this species. In contrast, many taxonomists will think that preserving at least one specimen in order to preserve *information* for science, should be the priority in such situations. Both points of view have supporting arguments, and there is not "one truth" in this respect. What will be decisive in the end is the relative social influence of the supporters of each approach. In this respect, it is clear that nowadays conservationists have built up strong social lobbies to support their ideas, which is not the case of zootaxonomists — who have shown until now very little aptitude for social communication and power (Dubois 2003) and who have not even proved able to create an international scientific society, not to mention a lobby (Dubois 2006c). But this does not demonstrate in the least that the former are "right" and the second "wrong" — only that the former are socially more efficient (which is widely different, and illustrated by many recent decisions of "policy makers" in science, a matter which is far beyond the scope of the present paper). At any rate, taxonomists should feel free to consider both options, and to do what they think is best, not what members of another community think is best in order to please so-called "social demand", which is in fact merely the demand of one social group, not of society as a whole.

As a matter of fact, the question may be asked whether the "message" that conservationists (at least those who fight against the collection of specimens to document the diversity of life on this planet) want to pass to "society" is the good one. This message is as follows: yes indeed, for centuries, and especially in the last decades, human societies have made "choices" (sometimes without realizing that they were doing so) that had major negative impacts on the ecological equilibria of the planet we live on, and in particular they have been (and still will be) responsible for innumerable species extinctions; however, some of their members at least have now become conscious of this problem, and have decided to do everything possible to stop this process. These persons think that the major priority of the next decade should be to "stop the erosion of biodiversity". Until this point, this message is likely to be agreed upon by most biodiversity-oriented biologists, including conservationists and taxonomists. But consensus is absent when it comes to two further statements: (1) collection of specimens by taxonomists and for museums is a major factor of species extinctions; (2) we have the power to "repair" the destructions that our civilization has done. Let us consider these two statements.

As oultined by Patterson (2002), not a single case is known where *scientific* collecting has imperiled or caused the extinction of any Neotropical mammal, and we do not know of a single case in any other zoological group. In a few cases of species with commercial value, either as brightly colored, spectacular pets (especially in vertebrates), or as "rare" and very appreciated collection items (especially in insects and molluscs), massive collection may have contributed to deplete or even wipe out some populations or species, but this has nothing to do with taxonomic research and museum collections. Even when taxonomists collect what they consider to be "large series" of specimens (quite useful for the appreciation of intra- and interpopulational variation, and therefore for the characterisation of specific and subspecific taxa), such series are ridiculously small compared with the captures made for human consumption, by pet trade or by insect or mollusc collectors. It is hypocrit, misleading and ill-directed to confound both activities.

Taxonomists, who are an infime minority with a very little power, cannot be the scapegoat for all the mistakes and crimes made by our societies in the last century. It may be appealing to throw back all responsibilities on this small and weak community, but it does not solve anything. Furthermore, even if this is not appreciated by many, practising field taxonomists are in fact among the persons who have the best knowledge of real biodiversity in the wild, and their daily experience is that extinctions are going on at a very rapid pace, in many habitats but mostly in tropical areas, as a result of factors such as deforestation, destruction of humid zones, pollutions of all kinds, climate changes, faunistic and genetic pollution (Dubois 2006c), etc. Most of these destructions are of such a magnitude, and show no significant trend of change (despite repeated declarations and statements), that it is completely misleading to pretend that these phenomena will stop in the next decades, not to say that our civilization will "repair" the results of its mistakes.

Many of these debates, however, are carried out as if we were in an "ideal" world where it would be enough to say something to see it happen. In the just recent years, many members of our societies (who were still, several decades ago, treating those of us who were announcing massive extinctions, of birds of ill omen or simply of liers) have progressively become conscious that our civilization is indeed destroying a large proportion of the species biodiversity of our planet. This is a nice step, but as long as it is not followed by major changes in major options of our world, regarding industry, economics, profit and decision-making, this consciousness-raising will have little material impact. Words won't replace action in this respect, and as long as our societies do not make these major changes, extinctions will go on. Saying and writing the contrary is lying to the public. And it is a lie to say that we will "repair" the damages we have done.

Promoting the idea that collecting *one specimen* for the taxonomic and nomenclatural purpose to have an onomatophore, i.e., a testimony of the existence of a species for present and future researchers, is a major factor of species extinction, is an hypocrisy and a lie. It does not help "conservation biology" to reach any of its aims — but it may appear easier and less costly to pretend so than to struggle against industrial lobbies or shareholders of companies responsible of the current disaster. Taxonomists should resist this pressure, and organize themselves for this resistance.

Today, "conservation" appears to many as a more laudable aim than "knowledge". However, one of the major aims of science, besides helping man to act efficiently in mastering the causes and effects, is "simply" to "understand" the world we live in. One of the major aims of comparative (i.e., non-reductionist) biology is to understand how evolution has proceeded, and to reply these "how" and "why" questions it is first necessary to reply "what" questions (Mayr 1997). With less, or possibly much less, than 10 % of the living species of our planet yet collected, described and named, we cannot say that we are close to answering the "what" questions of biodiversity (Dubois submitted-a) — which means that we are still far from being able to answer the "how" and "why" questions. Isn't it legitimate to think that answering these questions should remain a major goal of science and culture?

The gigantic recent progresses in molecular study of organisms, especially through the use of nucleic acid sequencing for molecular phylogeny, have tended to obscure the nature of biodiversity for many zoologists, some of whom have no or almost no "culture" in morphology, anatomy, behaviour, etc. As interesting as knowing the DNA sequences of an organism may be, these won't tell us everything about the organism. Until the phenotype, behaviour, ecology, of a species have been studied, we know almost nothing about this species, even if we have an hypothesis on its phylogenetic position and if we are able to "recognize" it by its DNA

Fortunately, in front of those who think that everything about organisms can be known from their and photographs, the irreplaceable rôle of vouchers and specimen collections in systematics, and more generally in all works on biodiversity, has been outlined repeatedly by workers in botany (Funk *et al.* 2005), herpetology (Stuebing 1998), ornithology (Goodman & Lanyon 1994, Remsen 1995, Winker 1996) and mammalogy (Patterson 2002).

The contribution of a specimen to our knowledge about biodiversity is roughly inversely proportional to its rarity. Several steps can be distinguished in our knowledge of a species through specimens. The first one is passing from *no* specimen to *one* specimen. The second one is passing from one to several from the same population, especially to a second one of the opposite sex. A third step can be recognized when small series of specimens, e.g., of 8–20 specimens of each sex from a population, are available, as these allow simple statistical tests for comparisons of samples (Dubois 1984), and a fourth step is attained when samples from several populations referred to the same species have been collected. Among these steps, the one which is by far the main one, for our knowledge, is the first one. The number of characters that can be studied on a specimen is virtually endless (Dubois & Ohler 1997a), and a single holotype allows innumerable observations, especially when non-intrusive techniques such as radiograph or scanner are used. But lacking a holotype, even when DNA or photographs are available, precludes a number of studies.

Recent trends for opposition to collecting specimens are, at least, in the eyes of taxonomists and evolutionary biologists, based on a ill-understood approach to "ethics", chosing ignorance in the name of "conservation", although it is clear that efficient conservation cannot be based on ignorance. This was a rarity a few years ago, when a student in a field research party could decide to release at night a specimen of a new species of salamander kept alive in a plastic bag (David Wake, personal communication to AD, about the specimen of the new species *Bolitoglossa jacksoni* shown in fig. 6 of the paper by Elias 1984). Nowadays, when finding a unique specimen of a lizard species considered extinct and rediscovered after 130 years, even a professional zoologist may decide to photograph and release it (Ineich 2006): what could have been in a rather recent past considered a professional misconduct is now more or less imposed by the "ethically correct" tyranny. This is part of a more general trend in which some students may now embark on higher studies in biology but refuse to kill specimens or to experiment on them. If this trend goes on, zoologists may be forbidden to collect specimens even in order to photograph them or take a feather or a drop of blood from them, in order not to "disturb" them. This would indeed remind the obscurantist medieval times when anatomists and physicians would be forced to dungeon or to stake for having dissected human bodies.

Winker (1996) identified five causes for the opposition to collecting specimens for biodiversity studies: (1) focusing conservation at the level of the individual; (2) unfamiliarity with population biology; (3) misunderstanding of scientific research; (4) typological thinking; and (5) misplaced morality. Except for (4), all these factors are active in the opposition to collection and fixation of even a single specimen as holotype for a new species, and should be countered by taxonomists.

When Vieilliard (1976) described the new Kabyle bird species *Sitta ledanti*, he collected, killed and fixed one adult male for holotype and one adult female for paratype, although he was then aware of the existence of only a dozen of couples. No doubt if an ornithologist was doing this today, he would face difficult time with "conservation biologists". Nowadays, although still threatened, this species is still alive and other populations have been discovered (Bellatreche 1991, Doumandji & Kisserli 1993). However, the important point regarding the present discussion is that, if unfortunately this species had become extinct, the existence of one specimen of each sex in a museum collection was liable to provide major information on its morphology and anatomy which descriptions and illustrations alone could not provide. Taxonomists should care for obtaining such basic, "minimum" material, for all new species they discover and will discover in the coming years and decades.

The media and laymen are very excited everytime a new fossil species of dinosaur or humanoid, or a large species of living mammal or bird, is discovered, but interest is much weaker for less "extraordinary" discoveries, especially of organisms smaller, more discrete, or less close to our own species. Zoologists and especially taxonomists are not bound to share this approach, and may feel that any obscure mite or sea snail is as importo knowledge as a dinosaur. One way of making sure that discoveries of new species are transmitted to our descendants is not only to describe them but to keep voucher specimens in museums and other permanent collections. Nomenclatural Rules, in obliging serious taxonomists to keep at least one specimen of each described species, are a strong support for such an activity. The progress made in Article 16 of the last version of the *Code* should be made more irreversible by making this article more stringent. The need of depositing an onomatophore in a permanent public collection should be recognized for standard publications of species. However, some of the problems mentioned above should also be addressed. We therefore provide below some suggestions and recommendations in this respect for the future.

Proposals regarding the Rules of nomenclatural availability of nomina

Biology needs a universal and unambiguous language for the designation of taxa, and this language is provided by the codes of nomenclature. For a smooth and efficient functioning of these codes, some principles must be respected (Dubois 2005: 375–378). An important principle is simplicity, especially the fact that Rules are unique and general and contain as few exceptions and special situations as possible. In zoology, the current *Code* contains already too many exceptions and particular cases (especially Rules that are valid only until a certain date, or after a certain date), and if it was to be changed in this respect, this should be in the sense of simplification and uniformisation, i.e., of suppression of exceptions and particular cases. It would therefore not be appropriate to consider the introduction of special Rules for the availability of nomina, e.g., for "very endangered species", for "very rare species", for "species difficult to collect" or for "extinct species known only from iconographic documents". The same Rules should apply to all animal taxa, whether large or endangered, rare or common, living or extinct. However, there should be room within these Rules to deal appropriately with all specific cases and situations.

In our opinion, Article 16 should be made more stringent regarding the need of onomatophore deposition. We think the major strength of the *Code*, and its superiority over alternative nomenclatural systems that have been proposed, lies in its being based on onomatophores for allocation of nomina to taxa: this establishes a connexion between the world of organisms and that of language, and allows this allocation to be objective, not based on interpretations of definitions. We think the need of material onomatophores (i.e., specimens, not photographs, sound recordings or molecular sequences) for the availability (and hence validity) of zoological nomina should now become even more stringent than in the past. This would insure not only to maintain this objective reference for ascertaining the status of nomina, but also to make sure that at least one specimen of every new species described in this century will be the matter of a legacy to our descendants. This does not mean however that collection of specimens should be made blindly and without care for problems of species conservation. Regarding the latter problems, we think two different approaches should be combined: (1) the careful choice of specimens collected and fixed; (2) in some cases, the recourse to alternative approaches, i.e., delaying naming or naming through a specific action of the Commission.

The first way to conciliate the concerns for conservation issues with a *Code* requiring that at least one specimen should be held and conserved in trust for science, is through the choice of this specimen. In most cases, especially involving vertebrates, a male (preferably an older one, which has greater probability of having reproduced and of not being able to do it again) should be preferably kept instead of a female, due to the potential lower impact on the effective number of the population. In some other cases, when the sex ratio is particularly skewed, the specimen should be taken among the most abundant sex, and if several widely different phenotypes are observed, the most common one should be chosen.

Now, we have seen above that, in some cases, it is indeed useful to have the possibility to describe a new species without having a specimen in hand. It might indeed be the case in some exceptional cases (although not as a routine procedure) for species threatened with extinction but which might still survive if we do not fix men (e.g., a species for which only one couple would still be alive). It might be the case for some which are indeed (at least for the time being) impossible to collect or to conserve. Above all, it has and will certainly again be the case for species that are now (or are now believed to be) extinct, but for which illustrations or descriptions are available and informative enough to allow the proper description and naming of a new taxon.

In such cases, two different situations must be distinguished. In the first one, the possibility exists to obtain later a specimen that could be deposited in a collection as onomatophore. This may be after more precise estimates of the number of alive specimens of the species have been obtained, ascertaining that they are more numerous than initially thought, and allowing to collect one of them. This may be after recovery of an initially very low population, with increase in its size. This may be after discovery of other populations of the same species. This may be after permanent close watch of the relict population, allowing to collect one specimen after its natural death. This may be after techniques have been developed allowing to capture a specimen although this had long been considered impossible (as in the case of *Torquerator bullocki* mentioned above). In all these cases, it is certainly much better to wait for formally describing the new species until a specimen has been collected and studied. This would avoid basic factual mistakes based on wrong interpretations of photographs as in the example of *Torquerator bullocki*. This course is the one that had been suggested by Timm *et al.* (2005) in the case of the monkey *Lophocebus kipunji*: "Jones and colleagues are encouraged to acquire a specimen, or part(s) thereof, and prepare a new description of this, as yet, undescribed species".

This course raises only one problem, but a genuine one: the risk that (an)other author(s) than the discoverer(s) of the species take advantage of this absence of formal description to collect a specimen, describe and name it to become "author(s)" of the new nomen. Although this is not much mentioned in textbooks, the history of zootaxonomy is full of similar examples, which indeed are a major plague of the discipline, as is well known by all researchers in this field. Interestingly, in the many discussions that have been devoted in the recent years to proposals of changes or improvements that should be brought to the current nomenclatural Rules, few discussed this problem. As was very aptly pointed out by Ng (1994), the function of adding the name of the author after the nomen of a taxon is not to please the author, "to promote the reputation of a scientist or simply an egotistical exercise", but is to help "to keep track of authors, publication dates and to trace the original references", through databases like the *Zoological Record*. Dubois (2000) discussed this matter and suggested that mentioning only the publication year of the nomen, without the author(s)' names, would play the same function and would help limiting artificial inflation of unwarranted nomina provoked mostly by "mihilism", as Bruun (1950) ironically termed it. However, such a change would clearly threaten the egos of so many taxonomists that, although it may be highly desirable (Dubois submitted-b), it may not be easy to implement, as highlighted by the fact that promoters of the *Phylocode* project, who could well have decided not to add authors' names after their nomina, did not apparently consider doing so (Dubois 2005).

A second situation is that of species described on the basis of documents attesting the past existence of a taxon that is now extinct and for which it is unlikely that fossil or subfossil material will be discovered. Such unlikely events sometimes occur, as shown above by the case of the Mascarene turtle. A recent example is quite enlightening: Oliveira & Langguth (2006) elegantly showed that the new monkey species described as *Cebus queirozi* by Mendes Pontes *et al.* (2006) had already been described more than two centuries ago as *Simia flavia* Schreber, 1774. However, such rediscoveries are exceptions and in most cases the species will remain known only from the ancient documents and no specimen will ever be found. In such cases, it would not be clever to impede their formal description and naming because of rigid nomenclatural Rules. So a special solution must be found for such cases.

As mentioned above, there should be a single *Code*, not different Rules for different situations. We think the *Code* already contains a provision that would allow the description of new taxa, in some very exceptional cases, without material onomatophores. Article 10.1 of the current *Code* reads as follows:

"10.1. **General conditions to be met.** A name or nomenclatural act is available, and takes authorship and

> when it has satisfied the provisions of this Article and, when relevant, of Articles 11 to 20 (...). A be ruled to be available by the Commission (...) if these conditions are not fully met."

We think advantage should be taken of the last sentence of this article to solve the nomenclatural problem here addressed. In the exceptional cases where good reasons (as discussed above) would make it impossible to validly name a new taxon under the usual Rules of the *Code*, this could be done through submitting a special request to the Commission. This could take the form of submission of a manuscript for publication in the *Bulletin of Zoological Nomenclature*, the official journal of the Commission, followed by a vote of the latter to validate the new nomen (just like in the cases of normal applications submitted to the Commission for decision). This would be a heavy procedure, but one which would respect the current Rules of the *Code*. It should remain heavy in order to discourage "lazy" zootaxonomists to call upon it, as it should be used exceptionally, and not become a routine procedure. If nothing is done in this direction, it is not unlikely that in the coming decades all new species of primates, why not of mammals, why not of vertebrates, will be described on the basis of photographs or of DNA sequences taken from a hair, a feather or a drop of blood, without even a brief description of the organism, and without material onomatophores. For the reasons explained above, such a move would be very harmful to taxonomy in the future.

Conclusion

Voucher specimens play a crucial, although often misunderstood, role in modern taxonomic and evolutionary research. Among them, onomatophores ("name-bearing types") play a special function, being the objective references for the allocation of nomina to taxa. The Rules of the *Code*, which have been improved in the last edition in making compulsory the designation of a material onomatophore (one specimen or several specimens) for the availability of a new nomen, should also make compulsory the deposition of onomatophores in public collections. In the few exceptional cases where collection or conservation of a specimen is impossible (for difficulties of collecting or of keeping, for conservation reasons, or when the taxon is known only from ancient documents), choice should be made between two possible courses: (1) either preliminary description of the taxon through indirect evidence (photographs, DNA sequence, etc.), but without naming it, pending the acquisition of an onomatophore and its deposition in a public collection, whenever this subsequent acquisition is likely; (2) or formal description of the taxon and proposal of a new Latin nomen based only on photographs, drawings, DNA sequence or other indirect evidence, but then in a paper submitted for publication in the *Bulletin of Zoological Nomenclature*, followed by a vote of the Commission to validate nomenclatural availability of this new nomen under the provision of the last sentence of Article 10.1.

For implementation of these changes in the *Code*, we propose the following new wording for Article 16.4 (no changes are proposed in the four recommendations of this article):

"16.4 **Species-group names: explicit fixation and deposition in public collections of name-bearing types.** Every new specific and subspecific name published after 1999, except a new replacement name (a nomen novum), for which the name-bearing type of the nominal taxon it denotes is fixed automatically (...), must be accompanied in the original publication

16.4.1. by the explicit fixation of a holotype, or syntypes, for the nominal taxon (...), and,

16.4.2 by its deposition in a collection or several, with a statement indicating the name and location of this (or these) collection(s), or a statement that it or they will later be deposited there (see Recommendation 16C).

16.4.3. In the exceptional case where the holotype or syntypes cannot be collected and/or conserved (because the taxon is believed to be extinct, of difficulties or impossibilities of specimen collection or conservation, or because the taxon is threatened with extinction), formal description and naming of the taxon should be postponed until one or several specimens can be collected; if it is unlikely that any specimen will ever be available for deposition in a collection, the taxon should be described and named on the basis of indirect evi-

, ancient document showing an illustration or presenting a description of the taxon, photograph, ar data) in a paper submitted for publication in the *Bulletin of Zoological Nomenclature*, and formal ility of this name should be voted upon by the Commission as allowed by Article 10.1."

To complete this change in Article 16, the following new wording should be implemented in Article 73.1.4:

"73.1.4. Designation before 2000 of an illustration of a single specimen as a holotype is to be treated as designation of the specimen illustrated; the fact that the specimen no longer exists or cannot be traced does not of itself invalidate the designation. (...)

We believe these proposed changes in the *Code* would allow to solve the problem raised in recent papers, regarding the description and naming of new species without contributing to their extinction, but without opening the door for a routine description of new species without onomatophores, which would be very detrimental to taxonomy and to our knowledge of biodiversity.

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From the hobbit team, more human relations

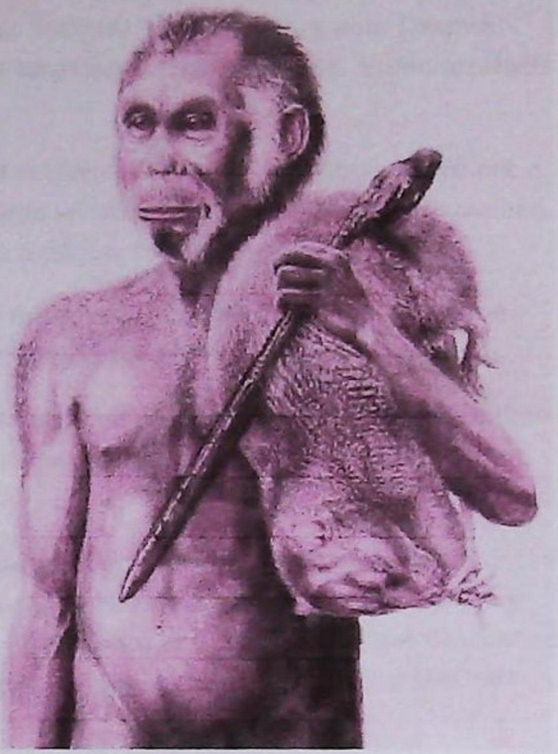
Stephen Cauchi
May 6, 2007

MORE bizarre, extinct human species — dwarfs and even giants — could be uncovered in Indonesia's southern islands, with the Australian discoverer of the "hobbit" set to begin fresh diggings next month.

Mike Morwood — who with fellow Australian Peter Brown led the team that discovered the hobbit, *Homo floresiensis*, in 2003 — is predicting further species will be uncovered on the islands of Timor and Sulawesi, which are near Flores.

Professor Morwood, with a team headed by Indonesian archaeological professor Fachroel Aziz from Indonesia's Geological Survey Institute, will soon start excavations in the Atambua Basin of Timor. Afterwards, the team will begin diggings in Sulawesi and will return to the Ling Bua cave in Flores, where the hobbit species was uncovered.

"We predict a number of these islands are probably going to have their own endemic human species, and many of them will be small," Professor Morwood, from the University of Wollongong, said.



Hobbit: small of stature but a huge scientific find.
Photo: *Robert Pearce*

He said the evolutionary challenges of living on small islands meant animals — and early humans, or hominids — tended to shrink or grow, dramatically, over a number of generations.

Island gigantism — a form of natural selection in which bigger size provides a survival advantage — can be seen in the Komodo dragon and the giant tortoise of the Seychelles, as well as extinct species such as the moa and dodo.

Although the trend on islands is for large animals such as humans to shrink and small animals such as rodents to grow, there are glaring exceptions. There are islands with gigantic and dwarf forms of the same type of animal.

"If the island is large enough, and Sulawesi is, (you could have a situation where) a hominid gets there and some become small and some become bigger," Professor Morwood said. "Sulawesi could be a place where you have a whole range of hominid species."

The discovery of the hobbit rocked the scientific world, and it has earned the title of one of the most significant anthropological discoveries of the past century.

Its tiny stature, and recent passing, stunned anthropologists. It died out only 13,000 years ago, making it the most-recent living human relative.

The only other human species known to have coexisted with modern humans (*Homo sapiens*) were Neanderthal man and *Homo erectus*. Neanderthal man lived in Europe, becoming extinct 30,000 years ago. *Homo erectus* lived in Asia and became extinct possibly 100,000 years ago. Despite having a small brain, the hobbit species could cook, hunt large prey and build rafts. Stone artefacts and animal remains were found with their skeletons.

Controversy arose when some Australian and Indonesian scientists claimed the hobbits were not a separate species, but only pygmy versions of *Homo sapiens* whose small brains could be explained by disease. This view remains discredited by mainstream anthropologists.

Professor Morwood flagged that any new human species found on Timor and Sulawesi would be called *Homo timoriensis* and *Homo celebesiensis* (Celebes being the former name of Sulawesi).

He said these new species would have evolved separately on their respective islands for more than a million years. Although they could be similar is size, they would be different enough to warrant their own species name.

Professor Morwood said further archaeological finds would help answer the puzzling question of the ancestry of the hobbit, which could lead to a total redrawing of the human family tree. A popular explanation is that the hobbit — and any species that lived in Timor and Sulawesi — are descended from *Homo erectus*, which lived in Indonesia, notably Java, for thousands of years. But this was probably wrong, Professor Morwood said.

"Some of the traits of *Homo floresiensis* are so primitive — they're more primitive than you find in *Homo erectus*. It seems likely that the ancestor was something before *Homo erectus*," he said.

If true, this would revolutionise our understanding of human history because *Homo erectus* was believed to be the first early human that was advanced enough to leave Africa.

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cut of the fish, and underneath the following lines): —

> "The Workes of God how great and strange they be,
> A Picture plaine behold heare may you see."

Two years later, Timothy Granger penned, and Thomas Colwell printed, a prose description of

> "A moste true and marveilous straunge wonder the lyke hath seldom been seene of xvii Monstrous fishes taken in Suffolke at Downam Brydge, within a myle of Ipswiche, the xi daye of October in the yeare of our Lorde God 1568."

Stow, in his *Annales*, has left us a particular description of this "wondrous draught of fishes;" some of them being "eight and twentie foote in length, at the least."

The following year "C. R.," probably Clement Robinson, the author of *Pleasant Sonnets and Stories in Metre*, favoured the world with

> "The true description of this marvellous straunge Fishe, which was taken on thursday was sennight, the 16 day of June, this present month, in the year of our Lord God 1569."

This production also came from the fertile press of Thomas Colwell, "beneath the Conduit, at the signe of Saint John Evangelist," in Fleet-street. A copy is preserved in the rare collection of George Daniel of Islington. Like its predecessor, it is ornamented with the "effigies," in wood, of the "strange fish."

Wolfe, in 1586, printed a broadside containing an account of a monster fish found in the heart of a horse! And on the Registers of the Stationers' Company for 1595, is entered an account of "A strange and hughe fishe dryven on the Sandes at Outhorne in Holdernes, in Februarye." The interesting books of the same Company also contain an entry, in 1604, of "A strange reporte of a monstrous fish that appeared in the form of a woman from her waist upward, seene in the sea."

In Sir Henry Herbert's *Office Book*, which contains a register of all the shows of London from 1623 to 1642, occurs "A licence to Francis Sherret to show a straunge fish for a yeare, from the 10th of March, 1635."

In the Gough Collection, preserved in the Bodleian library, is a curious prose tract of eight quarto pages, "printed for Nath. Butter, 1642," with the following quaint title: —

> "A Relation of a terrible Monster, taken by a Fisherman near Wollage, July 15, 1642, and is now to be seen in King Street, Westminster, the shape whereof is like a Toad, and may be called a Toad-Fish; but that which makes it a Monster is, that it hath hands with fingers like a man, and is chested like a man, being neere five foot long, and three feet over the thickness of an ordinary man. Whereunto is added, a relation of a bloudy encounter betwixt the Lord Faulconbridge and Sir John Hotham, wherein the Duke of Richmond is hurt and the Lord Faulconbridge taken prisoner."

These notices of "strange fish" might readily be multiplied, but they will serve to introduce the following broadside, which is copied *literatim* from the original in my possession: —

> "*A most Strange but True*
> Account
> *of a very*
> Large Sea-Monster,
>
> "That was found last *Saturday* in a Common-Shore in New Fleet-Street in Spittle-Fields, where at the *Black-Swan* Alehouse, thousands of People resort to see it: Herein you have the Dimensions of the said Surprizing Creature, with the various Conjectures of several able Men concerning what may be the Omen of this Creature's leaving the Sea, and to rove so far under Ground, the Common-Shore where it was found running above two Miles before it empties itself at Blackwall: The occasion of this Creature's coming hither being likewise hinted on by P——ge in his Monthly Prognostications for this year 1704.
>
> "Presaging the several mutations which are approaching to Kingdoms, States, and Commonwealths, something appears wond'rous in the Heavens, Earth, or Watry Element, by frightful Blazing Comets, Monstrous Births, or strange Fishes leaving their deep Habitations of the Sea to swim in Brooks and Rivers: and as to strange Omens foretelling Alterations in this Kingdom, our Chronicles give an Account that when King *Ethelred* ascended the Throne by his Mother's murdering his Brother *Edward*, upon his Coronation-Day, a Cloud was seen throughout *England*, half resembling Blood, and half Fire; which Prodigy was the forerunner of the *Danes* landing here three years after, and committing great outrages in divers parts of the Kingdom. Before *William Rufus* was kill'd by *Sir Walter Tyrrel* in *New Forrest*, two blazing Stars appeared; and at *Finchhamstead*, near *Abington* in *Berkshire*, a Well of Bloody colour'd water sprung up for fifteen days, and then ceased. Before *Henry* the Second dyed it rained Blood in the Isle of *Wight*, for the space of two hours; a Dragon of marvellous bigness was discovered at St. *Osyph* in *Essex*; an Earthquake rented in pieces the Cathedral at *Lincoln*; and in *Orford* in Sussex, certain Fisher-men drew up in their Net a Hairy Creature out of the Sea, in all Proportions like a Man, which was exposed to the Sight of Thousands, living upon Flesh, but in the end stole from his Keepers and got to Sea again. In the Reign of *Henry* the Third, four *Suns* appeared from the rising to the setting, after which followed a great Famine. Before *Richard's* resignation of his Crown, to *Henry* the Fourth, the Bay and Lawrel Trees withered throughout *England*. In the time of *Henry* the Sixth, whilst a great Fight was at *Ludlow* betwixt the two Houses of *York* and *Lancaster*, three Suns appeared in the Firmament, which immediately united into one, and the next Reign began the Union of the Families. And so when *Oliver Cromwell's* Usurpation was at end, the Members of the *Calves head Club* confederate the Devil fetcht him away in a terrible Whirlwind. But now as strange a Wonder ensues, which take as follows.
>
> "On *Saturday* last, being the 20th of this instant *May*, something of a strange unusual Shape was perceived to be in a Common Shore in *New-Fleet-street* in *Spittle-Fields*, which excited their Curiosity who saw it, to make a further search into the Matter, and accordingly going into the Common-shore (which runs above two miles under Ground before it empties it self at *Blackwall*), they dragged the Creature out, which was a dead *Porpoise* of a very large Size, it being above Four Foot in Length, and Three Foot about, which now is to be seen at the Sign of the *Black-Swan*, an Alehouse, in *New-Fleet-Street* in *Spittle-Fields*, as aforesaid, to which thousands of People daily resort to view it: Now as to the Nature of this

Fish, which is vulgarly called a *Sea-Hog*, from its being like a Swine both in Shape and Flesh, its Residence is in the Sea, and appear in multitudes against an approaching Storm, tumbling after a strange manner with their Bellies upwards, about Ships that are on their several Voyages; and that it should leave the Deep to rove up into Fresh Water Rivers, and more especially to crawl so far up a Common-Shore, it seems somewhat amazing among the Curious; there is now great turning over of *Partridge* whose Prognostications are much admired by the Mob, but they find he has took no more Notice in this year's Almanack of this *Porpoises* untimely Death in a Common-Shore, than of the Thunder which we had last Week, he taking no notice that we shall have any at all this Year; but to make amends for this Fault, I believe it wou'd be very acceptible to the Fools under *Crispin's* Meridian, if in his next year's Almanack he would oblige them with the *Hyleg* of this poor Fish: but the general conjecture of this Creature's rambling so far up a sh—n Concavity under Ground, is, that it either came from the *French* Coasts, and signifies *Lewis* is ready to beshit himself, for fear the Affair will not go as they shou'd do in *Spain*; or else it came from the *Spanish* Coasts, and intimates, by his Obscurity, that the Duke of *Anjou* had rather hide his head than fight; and the last Conjecture I believe to be most probable, because *Partridge* says in his Prognostications in this Month, *The Gingerbread King of Spain full of Fears and Fatigue, it belongs to the Family.* Moreover it is thought this *Strange Fish* came of some good Family, because the Possessors of it talk of having R——l in F—— street embalm it against they show it at *Green-Goose-Fair*.

"Licensed according to Order.

"London, Printed for R. Smith near Spittle-Fields-Market, 1704."

EDWARD F. RIMBAULT.

FLY-LEAF SCRIBBLINGS, ETC.

1. From the man who rescued the Queen Mary's psalter from destruction, on presenting it to the queen:—

"God save the most vertuous and Nobull quene Mary's gras,
And sende her to injoye the crowne of Eynglande longe tyme and space,
Her enemies to confounde and utterly to deface,
And to follo her godly procedynges, God give us gras;
As every subyegte us bounde for her gras to praye
That God may preserve her body from all dangers both night and daye,
God save the Quene.

Be me, your humbul and poore creytur, Rafe Pryne, Grocer of London, wishes your Gras prosperus helthe."

2. From an early book in Sion College:—

"Item si mulier jejuna bibat per triduum duos ciathos aquæ in quâ *erramentum* extinguitur, fit in perpetuum sterilis."

What is *erramentum*?

3. Line (in book of Homilies by a vicar of Magd. Oxon. fifteenth century) which reads the same both ways:—

"Anna tenet mappam madidam, mappam tenet Anna."

4. In a MS., end of the seventeenth century:—

"Testamentum J. M. Ari (propria manu scribentis), A.D. 1736, ætatis 77; cui singulari fere forte evenit, ut de paterna gente sedulo inquirenti, non occurrebat quispiam oriundus. In fide, spe et charitate humillima omnipotenti Creatori animam dedo.

"Acceptationem penitentiæ meæ et remissionem peccatorum supplicissime implorans, et ad extremum vitæ terminum imploraturus per Jesum Xtum Salvatorem nostrum.

"Pater de Cœlis, Deus Fili Redemptor Mundi, Deus Spiritus Sanctus, Deus Sancta Trinitas, Unus Deus,

"MISERERE MEI."

I should much like to know who was the writer

5. Sixteenth century:—

"There is no charge in the Churche so daungerous but y^{t} a good conscience can avoyde it; but a weak or corrupt conscience may sone be cast awaye: like as the wild rose from whence the bee fetcheth her hony, and likewise the spider her poyson. The Prince may do his devoir doing justece, and not doing tyranny. The man of armes, going to the warre and not hurting the poore people. The maried man may live well in his house w^{t}out advoutery. The riche man geveth his goods for God's sake w^{t}out usury. The laborer in workyng. The shepehard in kyping of his shepe w^{t}out hertyng of his neighbors, and in like case of others.

"Now to prove this is true from the Scripture, David was good and Saule evill: Of pristes, Mathias good, and Obnias (Hophni?) naught: Of prophetes, Danyel good, Balam evill: Of shepeherdes, Abell good, Abimilech evil; Of widowes, Judithe good, Jezabell evill: Of riche, Job good, Naball naught; Of the apostles, St. Peter good, Judas was reproved.

"Respice finis (*sic*).
"And y^{u} shalt nev^{r} do amiss.
"Posui finem curis, spes ac fortuna valete."

J. C. J.

A Friend to the House of Hanover.—On a fly-leaf of a work entitled "*Mathematical Tables, &c.*, by J. Brown, Mathematician," published the latter end of last century, and which I picked up at a recent sale of old books in this place, I found the following quaint verses inscribed, in which strong proof is afforded of the writer having been any but an adherent of the hapless House of Stuart.

"I love with all my heart
The Hanoverian part,
And for their settlement,
My conscience gives consent.
Most glorious is the cause
To fight for George's Laws.
This is my mind and heart,
Tho' none should take my part,
The tory party here
Most hatefull doth appear.
I ever have denied
To be on James's side:
To be with such a king
Will Britain's ruin bring:
In this opinion I
Resolve to live and die."

K.

Arbroath.

Inscription in a Bible.—On a fly-leaf of an an-

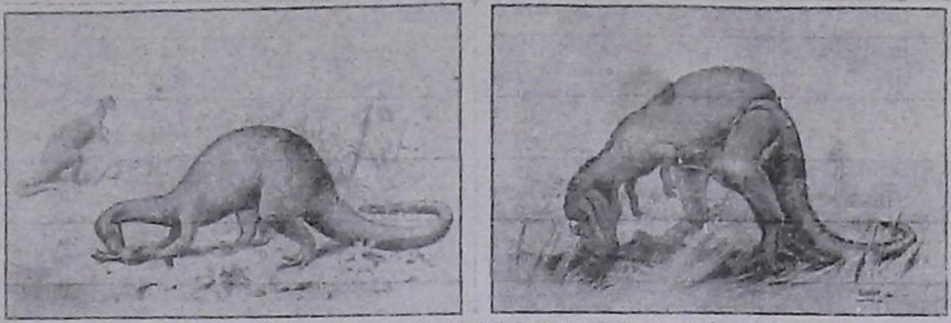
WONDERFUL STUNTS OF GEORGETOWN'S DRAGON

WEST WASHINGTON MUCH [illegible] OVER A QUEER CREATURE.

[illegible]

[illegible]

WHICH WOULD YOU PREFER TO MEET IN THE DARK?



Georgetown citizens divided as to which of these two friends, the [illegible] or the [illegible], the River Dragon most resembles.

MYSTERIES WHOSE EXPLANATION IS FURNISHED BY THE DRAGON

The leak in the cofferdam, which [illegible] afresh each night for weeks, after tons upon tons of [illegible] had stopped it during the day.

The mysterious, three-pronged tracks in the soft banks, seen and reported by Harry Johnson.

The missing [illegible] and the sheep of [illegible] McKinney.

The fate of the "cow with the crumpled horn," that trod the meadow, all forlorn, and on a midnight, dark and stormy, [illegible], never to return.

The startling manner in which the ice gorge was broken up, after dynamite had failed to dislodge it.

[illegible]

LONG, SCIENTIFIC NAMES, COINED FOR IT, ON EVERY TONGUE.

[illegible] at Night to Prey on the Stock, Broke Up Ice.

[illegible]

PICTURES OF LIFE AS PORTRAYED BY THE STORY TELLERS

THE REVOLT OF FAIRFAX.

[illegible]

THE TRAMP'S LOVE STORY.

[illegible]

yer, and the mother is a daughter of the late Gov. Duncan, of Illinois. The family consists of ten boys and one girl, and is a little nation in itself. The boys are natural-born scientists, artists and mechanics. Besides cultivating a farm they publish a magazine, build boats, prepare specimens of entomology, manufacture toys, teach school, and conclude the catalogue of their industries by writing for the papers. The publication is a handsomely printed magazine of twenty-four pages, and contains many interesting original articles, most of them being from the pens of the Putnam family. In their last issue they gave notice that the sister, Bessie Putnam, is admitted to the partnership, and that hereafter the firm name will be Putnam Brothers & Sister. The members of the firm are Joseph, aged eighteen years; Charles, seventeen; John, fifteen; Henry, twelve; William, eleven; George, eight, and Besse, seven. —*Inter-Ocean.*

A Man-Eating Tree.

THE New York *World* publishes the following unique production, said to have been condensed from a Carlsruhe magazine. The extract purports to be from a letter written by one Kurl Lecht, a traveler in Madagascar. The writer says:

At the bottom of the valley (I had no barometer, but should think it not over 400 feet above the level of the sea) and near its eastern extremity we came to a deep, tarn-like lake, about a mile in diameter, the sluggish, oily waters of which overflow into a tortuous, reedy canal that went unwillingly into the recesses of a black forest, jungle below, palm above. This lake was filled with alligators, and its jungled borders were the home of the chetah and a variety of venomous serpents. Great ferns bent over its margin, and its surface was spotted with leaves and flowers of the lotus. A path, diverging from its southern side, struck boldly for the heart of the forbidding and seemingly impenetrable forest. Henrick led the way along this path, I following closely, and behind me a curious rabble of Mkodos, men, women and children. After we were fairly in the forest the shade overhead was so dense that the jungle and undergrowth almost disappeared and instead there was a damp, boggy turf, cold, spongy, and yielding to the tread. The stalks of the tall trees rose like columns, the vines hanging down from them in festoons, and their roots running over the ground in every direction made walking difficult

about in fold after fold, ever tightening, with the cruel swiftness and savage tenacity of anacondas fastening upon their prey. It was the barbarity of the Laocoon without its beauty—this strange, horrible murder. And now the great leaves rose slowly and stiffly like the arms of a derrick, erected themselves in the air, approached one another and closed about the dead and hampered victim with the silent force of a hydraulic press and the ruthless purpose of a thumb-screw. A moment more and, while I could see the bases of these great levers pressing more tightly toward each other, from their interstices there trickled down the stalk of the tree great streams of the viscid, honey-like fluid, mingled horribly with the blood and oozing viscera of the victim. At the sight of this the savage hordes around me, yelling madly, bounded forward, crowded to the tree, clasped it, and with cups, leaves, hands and tongues got each one enough of the liquor to send him mad and frantic. Then ensued a grotesque and undescribably hideous orgie, from which, even while its convulsive madness was turning readily into delirium and insensibility, Henrick dragged me hurriedly away into the recesses of the forest, hiding me from the dangerous brutes and the brutes from me. May I never see such a sight again!

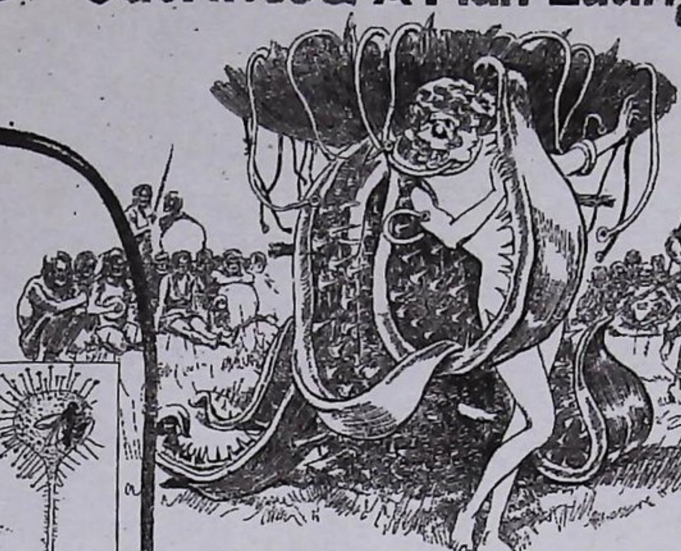
In the course of my stay in the valley of twenty-one days, I saw six other specimens of the Crinoida Dajecana, but none so large as this which the Mkodos worshiped. I discovered that they are unquestionably carnivorous, in the same sense that dionæa and drosera are insectivorous. The retracted leaves of the great tree kept their upright position during ten days, then, when I came again one morning, they were prone again, the tendrils stretched, the palpi floating, and nothing but a white skull at the foot of the tree to remind me of the sacrifice that had taken place there. I climbed into a neighboring tree and saw that all trace of the victim had disappeared and the cup was again supplied with the viscid fluid.

The indescribable rapidity and energy of its movements may be inferred from the fact that I saw a smaller one seize, capture and destroy an active little lemur which, dropping by accident upon it while watching and grinning at me, in vain endeavored to escape from the fatal toils.

With Henrick's assistance and the consent of some of the head men of the Mkodos (who, however, did not dare stay to witness the act of sacrilege), I cut down one of the minor trees and dissect-

Stevens Point Journal
Stevens Point, Wisconsin 5/30/1874

Sacrificed To A Man-Eating Plant



The Remarkable Experiences of a Distinguished Scientist in Madagascar and How Science Explains the Existence of the Monstrous Growths Upon Which He Has Made Official Report

By Dr. B. H. William.

The Distinguished American Botanist.

DR. KARL LECHE, the noted German explorer and scientist, has brought back from the wilds of Madagascar one of the most amazing stories that has ever come from the African island. He has described in the Carlsruhe Scientific Journal a plant which seems to be an extraordinary development of a certain curious form of vegetable life to which the famous Venus flytrap, or pitcher plant, and other insect catching and eating vegetation belong. This plant, or tree, which he calls Crinoida Dajeeana, attains, according to Dr. Leche, a size of ten feet, and is powerful enough to ensnare and destroy a human being. The Mkodos, the tribe in whose territory it is found, revere it as a fetish and sacrifice maidens of their tribe to it, says Leche.

A quarter of a century ago American Consuls in Madagascar mentioned this tree and sacrifices to it by natives in their reports.

Before discussing the plant from the botanical standpoint, I quote almost in full his narrative as it appears in the Scientific Journal, which is a publication of irreproachable conservatism and authority.

"I had gone," he writes, "to Madagascar, the land of the lemur, the lace plant, the aye-aye, and also of the man-eating tree, to visit Queen Ravalona II., and was persuaded to visit the Mkodos by a native who had heard that besides generous daily pay I was accustomed to reward liberally anyone who showed me something strange or out of the way.

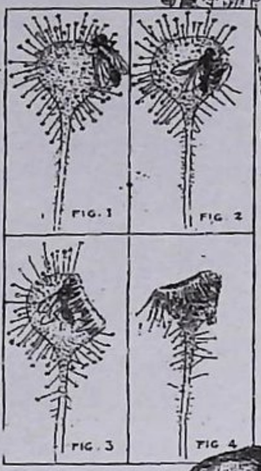
"In his company I journeyed to the southeastern part of the island, inland among the hills covered with thick virgin forest, where there is a district practically unknown, whose white visitors can be numbered on the fingers of one hand. This is the region inhabited by the Mkodos.

"It was while among these natives that I was witness to what was probably the most horrible sight I have ever seen. Their religion consists in the worship of their sacred tree, one of the most wonderful freaks of nature. To this tree they offer human sacrifice. Once upon a time, as each was consummated, it had been their custom to burn each tree. This, however, they had been forced to give up on discovering that the trees were getting to be very scarce. When I arrived they were practically extinct, and it was with difficulty that my guide, whose wild stories had attracted me to the place, could find one to show me.

"The sacred tree is most remarkable in appearance. Its trunk, which rarely rises ten feet above the ground, is of a strange, barrel-like shape, covered with a quaint mosaic sort of bark, looking like nothing so much as a gigantic pineapple. At the top of this trunk it is between eight and nine feet in circumference, and upon it is fixed a remarkable growth very much resembling a huge plate. From the top of the trunk there hung eight leaves. They were of extraordinary size, ten to twelve feet long, a foot wide where they were hinged to the tree, widening to about two feet, and finally tapering down to a point as sharp as a needle. They were plentifully strewn with huge venomous looking thorns.

"These leaves could not have been less than fifteen inches thick in the centre, and hung down inertly along the trunk, their points trailing in the earth. Above these there stretched, rigidly and horizontally, a number of branches several feet in length. Finally, from underneath the plate-like arrangement, there grew, pointing upward, half a dozen frail looking stamens—palpi would be a better name, I believe—that shivered constantly, as if agitated by some strong wind.

"It seems the plate-like affair on top of the trunk contained some thick sweet juice. This liquid, which is a product of the tree and was probably originally intended to attract birds, is highly intoxicating, and even a very small quantity very soon produces coma. When sacrifices take place a woman is forced to climb into the tree and drink. If the devil inside is in good humor, then the girl will be allowed to get down again in safety. If he was feeling ugly, however, then the poor girl was out of luck. Exactly how the tree was going to prevent her jumping down I could not make out, but I was to learn eventually.



How the Venus Flytrap Captures Insects: (1) The Fly Alighting Upon the Leaf; (2) the Fly Is Stuck Fast Upon the Viscous Substance with Which It Is Covered and the Leaf Begins to Curl About It; (3) the Leaf Holding the Fly Now Securely in Place, and (4) the Beast Plant Digesting the Insect. After It Has Digested, the Carcass of the Fly Is Dropped and the Leaf Is Opened for Another Victim.

"I desired to draw closer and examine the tree carefully, but my guide begged me not to, warning me that the tree god would certainly be angered at my sacrilege and would take my life in revenge, explaining that the leaves would rise up and crush me. Of course, I did not pay much attention to this, but, nevertheless, left the tree alone, for it has always been my habit to respect native superstitions and customs.

"One evening my guide presented himself to me and told me that what he had been waiting for would take place that night.

"That night, having made the chief a present to insure that I would be welcome to witness their ceremony, I followed the tribe into the forest. They made their way to the sacred tree, and round it built twelve fires, so that the whole surroundings were lit up brightly. Then they disposed themselves about them and made themselves at home, some eating, but most of them drinking huge gourdfuls of native ferment. Very soon they were all of them more or less intoxicated, both the men and the women, with the exception of a young girl nearby, who neither spoke nor moved, but glanced about her as if she were terrified out of her wits.

"Suddenly without warning the yelling ceased and they scattered away like frightened deer. The crucial point had arrived. For a moment there was complete silence but for the crackling of the fires. Intuition told me that the girl I had noted before was the one that was to be the sacrifice. I looked at her and saw mortal terror imprinted on her features. Yet for the life of me I could not imagine why, and put down her fear to imagination.

"By now the first group of dancers had somewhat recovered, and, suddenly springing up, rushed upon the poor girl with unearthly shrieks and yells. They surrounded her, and with shouts and gestures ordered her to climb the tree. Terrified she shrank back, apparently begging for mercy. At that the whole crowd joined in, furiously howling at her to obey. Once more the dancers gave out their orders; then, as she still refused and struggled, they armed themselves with spears, and stabbing at her forced her to retreat in the direction of the devil-god. For a while she resisted, seeking to hold their spears with her hands, and only getting wounded as a reward for her plucky defense.

"At last, seeing it was useless to fight further, she turned and faced the tree. For a moment she stood still, gathering herself up for a supreme effort, then quickly she sprang toward the tree. Like a monkey she scrambled up, and reaching the top knelt and drank of the holy liquid. Quickly she jumped up again, and I expected to see her jump down, thinking all was over, in that dim light not noticing instantly what caused her so to shriek with terror.

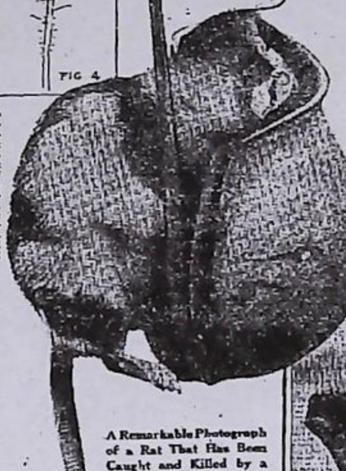
"Suddenly I realized what was happening, and I seemed to be paralyzed with horror. The tree, seemingly so dead and motionless a moment before, had come to life. The palpi, so frail looking, had suddenly ceased to quiver, and had coiled themselves about the girl's head and shoulders, holding her so firmly that all her efforts to free herself remained absolutely useless.

"The green branches so rigid before began to writhe, and coiled themselves round and round like snakes. Then as that mass struggled there arose a horrible sight I shall never forget—the great leaves began to rise, slowly, very slowly. Those evil-looking thorns were now on the inside, pointing toward the victim and closing on her with the force of a hydraulic press.

"As they came together tightly there trickled down the trunk a pinkish mixture, which the maddened natives fought and trod each other down to get one mouthful of—the intoxicating fluid from the tree and the blood of the human sacrifice.

"Then the feasting began again amid much rejoicing. The devil was appeased."

"The tree, seemingly so dead and motionless a moment before, had come to life. The palpi, so frail looking, had suddenly ceased to quiver, and had coiled themselves about the girl's head and shoulders, holding her so firmly that all her efforts to free herself remained absolutely useless."



A Remarkable Photograph of a Rat That Has Been Caught and Killed by a Giant Species of the Pitcher Plant. In the Cup of This Plant Is Secreted a Sweet But Stupefying Liquid. The Rat Has Drunk of This and the Plant Has Closed Upon It and Smothered It, the Flanges Holding the Body Tightly in Place.

The plant described by Dr. Leche has more points in common, perhaps, with the Venus flytrap than any other. This peculiar specimen is found nowhere in the world except in the swampy districts of North Carolina, and even there is quite rare. It subsists by catching and eating flies and other insects. Dr. George W. Crile, professor of surgery in the Western Reserve University and our greatest war surgeon in France and author of surgical books on the war, is authority upon the habits and anatomy of this plant.

It is an inconspicuous, low-growing plant, peculiar to boggy places. All day long its trap-leaves stand agape, waiting for prey. On the inside surfaces of each bivalve-like leaf is some sticky sweetish stuff, attractive to insects. Along comes an unlucky fly. Unsuspecting he steps into one of the traps. Instantly it closes upon him with a snap and he is a "goner."

Close examination of any one of the trap-leaves reveals the fact that three very minute hairs spring from the middle of the inside of each of its gaping valves. A touch upon one of these hairs (which are sensitive nerve-ends) makes the plant aware of the presence of the fly, and the "clamshell" snaps shut.

If one of the hairs be touched lightly with the point of a lead pencil the trap will instantly close. The plant does not know the difference. It simply reacts mechanically to the irritation. But the touch of the pencil must not be too light or too heavy; it must be just enough to imitate the contact of a fly or other small insect. If a smart blow be struck the trap will not respond at all; it stays open.

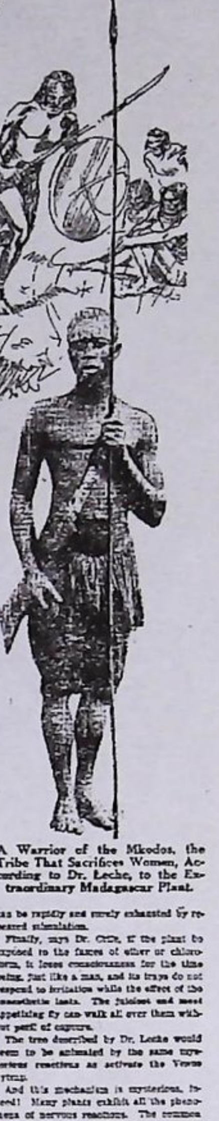
Suppose, however, that it is a real fly. The trap closes, its marginal spikes interlocking to prevent escape of the prey. Follows then a remarkable phenomenon. The trap becomes a miniature stomach, which at once begins to secrete a fluid for the digestion of the captured insect.

Photograph of the Peculiar Leaves of the Venus Flytrap Opened and Closed.

The process of digestion requires a number of days, during which the trap remains shut. This being finally accomplished, it opens, drops out the refuse of the meal—the non-nutritious part—and is ready for another fly. It is hungry again.

Dr. Crile says that the plant exhibits almost as much power of perception and discrimination as a frog—a creature that undeniably possesses a mind. It catches flies, eats and digests them, and ejects the refuse. A frog does the same, responding to the stimulus of the sight of a fly as the flytrap responds to the touch of the insect.

If the sensitive hairs of one of the traps be repeatedly touched in just the right way it will snap shut again and again, but not more than three or four times. The energy of the plant, like that of man, can be rapidly and surely exhausted by repeated stimulation.



A Warrior of the Mkodos, the Tribe That Sacrifices Women, According to Dr. Leche, to the Extraordinary Madagascar Plant.

Finally, says Dr. Crile, if the plant be exposed to the fumes of ether or chloroform, it loses consciousness for the time being, just like a man, and its traps do not respond to irritation while the effect of the anaesthetic lasts. The juiciest and most appetizing fly can walk all over them without peril of capture.

The tree described by Dr. Leche would seem to be animated by the same mysterious reactions as activate the Venus flytrap.

And this mechanism is mysterious, indeed! Many plants exhibit all the phenomena of nervous reactions. The common Sensitive plant, which belongs to the Mimosa family, and which closes its leaves not only at a touch, but actually at a sudden abrupt sound, would seem to predicate for that little growth not only tactile sense but hearing. The opening and closing of the human hand and the opening and closing of the Sensitive plant leaves are precisely the same. How are these sensations carried and what is the governing body which produces the reactions from these sensations?

The researches of the famous Dr. Bose, the Hindu scientist, have recently thrown great light upon the matter, and they go far toward confirming Dr. Leche's story. By means of magnification and certain arrangements of intense lights Dr. Bose was enabled to produce actual pictures of a plant's growth and life. While the plants seem to have no fibre such as we have, there is a tremendous sensitiveness between their cells. The cells are, indeed, a granulated nerve. The comparison might be made that instead of a wire such as our nerves may be likened to, the plant nerves are a series of small bodies with power of communicating impressions each to the other. What and where the directing force is—in a sentence, what and where is the plant brain?—is one of the mysteries science still have to reveal.

Intense as the interest the story of the Madagascar tree has aroused among botanists, there are few who will dare say it is impossible. It is to be hoped that a scientific expedition will soon go to the place indicated by the German explorer and make a careful study of the extraordinary plant.

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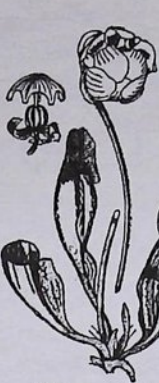
Fresh Tidings of Madagascar's Weird "Man Eating Tree"

Above, left, is shown Venus' Flytrap, familiar insect-catching plant, of which the man-eating tree may be a giant species.

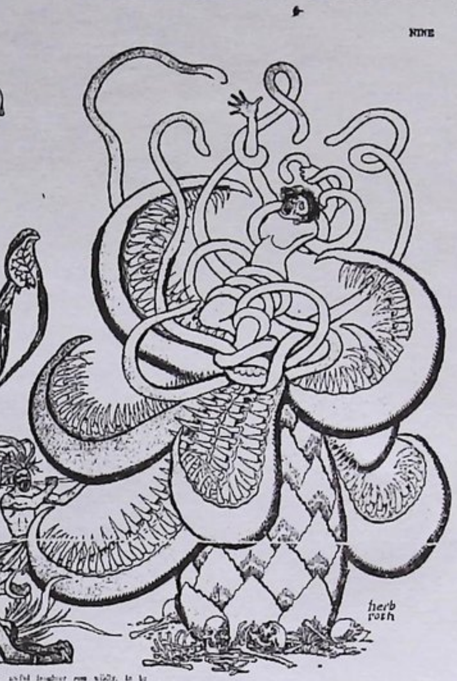
* * *

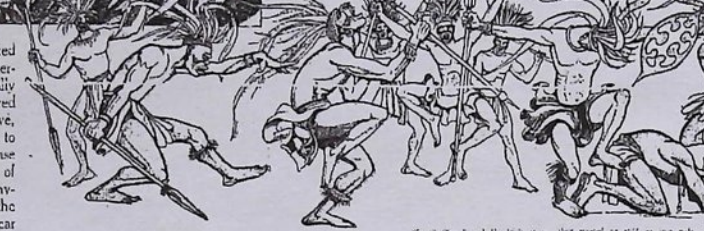
Hon. Chase Salmon Osborn, former Governor of Michigan, only American member of the Madagascar Academy of Science.

* * *



At right is pictured the Pitcher Plant, which drowns insects in water vessels.





This Monstrous Tree Has Spiked Leaves 12 Feet Long and Serpent-Like Tendrils, and Literally Devours Human Victims Offered as Living Sacrifices by Primitive, Savage Tribes, According to Story Brought Back by Dr. Chase Salmon Osborn, ex-Governor of Michigan an Experienced Traveler, Who Has Explored the Length, Breadth of Madagascar

By F. Gregory Hartswick.

SIR ARTHUR CONAN DOYLE tells the story of an American, visiting an English club, who astonished his listeners with a weird yarn of a valley called "Flytrap Gulch." The fearsome flytraps which figured in the tale were the well known plant called Venus's Flytrap (Dionaea muscipula), which catches flies and other insects by closing its leaves on them. The flytraps of "Flytrap Gulch," however, were of enormous size—as big as trees.

One evening two men quarreled violently in a saloon near the gulch. One threatened the other's life. Late that night screams were heard in the gulch, and the threatened man was missing next morning. The other was accused of his murder, and with frontier promptness judged guilty and led to the scene of his crime to be hanged. A rope had been thrown over one of the giant flytraps and the two were about to pull away, when a smaller plant that had been closed slowly unrolled its leaves. There, between these great jaws, with the [illegible] drove through his heart, lay the supposedly murdered man. He had lain in wait for his enemy, climbed upon the giant leaf of the plant to conceal himself and been devoured by the vegetable monster.

Sir Arthur concludes his story with the comments of two men at the club. "Evidently a matter-of-fact, truthful man," says one. "Or the most original liar that ever lived," replies the other. And Sir Arthur himself adds, "I wonder which was right."

If the American had located his tale on the island of Madagascar instead of California there would have been less chance of his being accused of lying, originally or otherwise. For, according to reputable printed records, on that island there is a tree that actually captures men and women alive.

In his recently published book, "Madagascar, Land of the Man-Eating Tree," Dr. Chase Salmon Osborn tells of this tree and quotes its description in a letter written by a traveler named Carle Liche to a certain Dr. Omelius Fredlowski, which was published in several European scientific organs and aroused widespread comment.

The idea of a man-devouring tree may seem ridiculous at first blush, says Dr. Osborn, but there is no reason why such a plant should not exist. There are insect-eating plants. The Venus' Fly-trap already mentioned is one particularly [illegible], as are the pitcher plants and the [illegible]. Some of these plants attract their prey by odor, hold them by their sticky tendrils and close their leaves, usually armed with spikes, over the struggling victim. Others, like the pitcher plant, lure the quarry to death by drowning in the water held in their cup-shaped cups.

In the Horticultural Hall in London there is a plant that actually eats mice. The animals are attracted by its pungent smell; the blossom has a hole just large enough for the mouse to enter. Once inside, bristle-like [illegible] the rodent, whose struggles eventually serve to [illegible] the cavernous bloom. The mouse is quickly smothered; digestive fluid is exuded from the plant and in a short time the whole body of the unfortunate victim is digested and absorbed.

Any of these plants, developed to the size of a tree, would be powerful enough to destroy a human being who was unwary enough to fall into its clutches. So the man-eating plant of Madagascar is not to be lightly dismissed as a traveler's fabrication.

According to the traveler Liche, whose letter Dr. Osborn quotes, the natives worship the tree as a god and sacrifice members of their own tribe to its fury. His description of one of these sacrificial orgies follows:

"The Mkodos of Madagascar are a very primitive race, going entirely naked, having only faint vestiges of tribal relations and no religion beyond that of the awful reverence which they pay to the sacred tree. . . . . . At the bottom of a valley (I had no barometer but should not think it over 400 feet above the level of the sea) we came to a deep tarn-like lake about a mile in diameter, the sluggish water of which overflowed into a tortuous reedy canal that went unwillingly into the recesses of a black forest composed of jungle below and palms above. A path diverging from its southern side struck boldly for the heart of the forbidding and seemingly impenetrable forest. Hendrick (his companion), led the way along this path, I following closely and behind me a curious rabble of Mkodos, men, women and children. Suddenly all the natives began to cry "Tepe! Tepe!" and Hendrick, stopping short, said 'Look!'

"The sluggish canal-like stream here wound slowly by, and upon a low spot in its bend was the most singular of trees.

"If you can imagine a pineapple 8 feet high and thick in proportion, resting upon its base and denuded of leaves you will have a good idea of the trunk of the tree. It was a dark, dingy brown; it was apparently as hard as iron. From the apex of this truncated cone (at least 2 feet in diameter) eight plantain leaves hung sheer to the ground, like trap doors swung back on their hinges. These leaves were about 12 feet long, they were about 2 feet through at their thickest point and 3 feet wide, tapering to a sharp point that looked like a cow's horn. The upper face was very concave, the lower slightly convex. This concave face was thickly set with large thorny hooks.

"The apex of the cone was a round, white concave figure like a small plate set within a larger one. This was not a flower but a receptacle and there exuded into it a clear treacle liquid, which I discovered later to be honey-sweet and possessed of violent intoxicating and soporific qualities. From underneath the rim of the undermost plate a series of long hairy green tendrils stretched out in every direction. These were 7 or 8 feet long and tapered from 4 inches in diameter, but they seemed as stiff as iron rods. Above these, from between the upper and under cups, six white transparent palpi reared themselves toward the sky, twirling and twisting with a marvelous incessant motion yet constantly reaching upward. They made me shudder in spite of myself, with their suggestion of [illegible] serpents dancing upright on their tails.

"My observations were suddenly interrupted by the natives, who had been shrieking around the tree and shouting what Hendrick told me were propitiatory hymns to the great tree devil. With still wilder shrieks and shouts they now surrounded one of their women. With the points of their javelins they drove her forward till slowly, with despairing face, she climbed up the stalk of the tree and stood on the summit of the cone with those horrible palpi swirling all around her. The men cried 'Tsik! Tsik!' (drink! drink!). Stooping, she drank of the viscid fluid in the cup, rising instantly again with frenzied face and convulsive limbs. But she did not jump, as evidently she had intended to.

"The atrocious [illegible] tree that had been so inert and dead came to sudden savage life. The slender, delicate palpi [illegible] over the doomed woman's head and then, with the fury of starved serpents, fastened sudden coils around her neck and arms. Then while her awful screams and still more awful laughter rose wildly, to be instantly strangled into a gurgling moan, the tendrils one after another with hydra energy and ferocity rose and wrapped her about in fold after fold, tightening with the cruel swiftness and savage tenacity of an anaconda upon its prey. It was the barbarity of the Laocoon without its beauty—this strange, savage murder.

"And now the great green leaves rose slowly and stiffly, like the arms of a derrick, approached one another and closed over the victim with the silent force of a hydraulic press and the ruthless purpose of a thumbscrew. A moment more, and while I could see the bases of these great leaves pressing more tightly toward each other, from their interstices there trickled down the stalk of the tree streams of the viscid honey-like fluid mingled horribly with the blood and oozing viscera of the victim.

"At this sight the savage hordes around me, yelling madly, bounded forward, crowded to the tree and with cups, leaves, hands and tongues lapped greedily at the dreadful stuff. Then each had enough to make him frantically mad. There ensued a grotesque, indescribably hideous orgy, from which even while its convulsive madness was turning rapidly into delirium and insensibility, Hendrick dragged me away into the recesses of the forest. May I never see such a sight again!

"The retracted leaves of the great tree kept their upright position for ten days. When I came back at the end of that time they were prone again, the palpi floating, the tendrils stretched and nothing but a white skull at the foot of the tree remained to remind me of the hideous sacrifice that had taken place there. I climbed into a neighboring tree and saw that all trace of the victim had disappeared and that the cup was again supplied with the strange viscid fluid."

This is the well-ordered account of an experienced traveler. In support of his story Dr. Osborn cites the [illegible] legends of the tree that the natives circulate among themselves, and the fact that even missionaries, whose first duty is to drive out superstition, admit the possibility and remark that the unanimity of tribal legend on the subject seems to be without foundation in fact.

Dr. Osborn states that though he has traveled the length and breadth of Madagascar he never saw such a tree, but of the peoples he met, widely divergent in religion, customs and even racial characteristics, had stories and myths about it. In such a territory, where intercommunication is so difficult and dangerous, such a legend would not possibly exist without some definite base.

The inhabitants of Madagascar, largely composed of the Malagasy tribe, are fairly civilized and not at all the debased type of savage which would be easily misled by legend. Dr. Osborn's description of the island emphasizes the statement that "no other part of the world presents such a juxtaposition of the wild and the tame, the bizarre and the common, of myth and truth." He adds the instructive statement that a letter written in good faith from the island by the Abbe de Choisy, a French missionary, to the Abbe de Marolles in France was, when printed and circulated, regarded by many readers as a satire on the court of [illegible], which at that time was fashionable. No one for a moment thought that its astounding information could be literally true.

So before scoffing at the story of the man-eating tree it is well to pause for reflection. Nature's wonders have never been limited and there are still spots on this globe that man has not fully investigated. It may come to some fortunate explorer of our own time to be the first white man since the days of Carle Liche to set eyes upon this most strange and monstrous of all natural horrors and wonders.

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In the Woods

by
FRANK W. SULLIVAN

Fact or fiction?

From time to time, rumors and reports appear in newspapers, books, and magazines about the possibility of living dinosaurs or other such monsters. Those who make these reports hold that many strange creatures walk ur world of which we know nothing. Strange plants, lost worlds, and lost civilizations —are all such rumors false? Quien sabe?

Over a number of years, I have read such reports and in some cases jotted down notes. In the year 1922 the newspapers carried reports about a plesiosaur that supposed to be living in a South American Lake.

The Plesiosaurs were common in the Jurassic Oceans of many millions of years ago and their contemporaries were the early sea turtles and marine lizards. I could never find any more information on this so-called sighting.

Another such report was made some years ago by Richard D'Orsay, American explorer and hunter. He reports actually watching a prehistoric monster feeding. I still have this yellowed and faded report and will quote D'Orsay's own words in regards to what he claims to have seen.

Mr. D'Orsay, at the time of his report, was in his forties, a well educated man, French by birth and American by naturalization. He has spent many years in the remote, desolate, mountains and valley waters of the Amazon River, in Central Ecuador, searching for an Inca treasure. Now let us tell his story.

"Within this vastness are valleys through which tumbling waters flow, plains of waist-high grass, forests, chasms and boulders of enormous size. It is way off the beaten track, in a vast area of valleys and peaks in the Andes. On the east is an impenetrable section of unexplored jungle. On the other sides are mountains that even a burro cannot climb.

"On one day of my search I had crossed a plain of some 20 or more square miles that was up to my hips in long, wiry grass. Although I crossed only a corner of this plain, it had taken me a full eight hours struggle to negotiate, a few miles.

"Most days in this region are ~~cloudy and visibility is rarely~~ good for over a mile. But the next morning, I could look across from the mountain side to see range after range of rolling mountains, stretching away towards the Amazon Territory.

"My gaze wandered down into the valley below that I had crossed the day before. It stopped short and quick. No, I didn't rub my eyes. I knew I wasn't dreaming. My eyes had never been opened so wide before.

"Here, below me, less than a mile away, an animal was grazing. But what an animal! This animal was a plant feeder, for as it moved along, the head would dip and come up with a mouthful of the long grass that clearly protruded from each side of its jaw.

"The head of this creature was not so big, but it was placed on a neck that must have been three yards long. The hump of its body was clearly discernible above the hip-high grass. I could make out a slow movement of a tail-like structure which extended several yards in back of the body hump. Then the head lowered. The animal was feeding.

"The upper part of the body undulated as the animal moved about. Again the head was raised as it were looking for a mate or perhaps an enemy. This time, it turned first in one direction, then another. Then it started to move through the grass, its head held high. Now I could see it clearly all except the lower limbs and feet.

"The front legs seemed to be shorter than the rear ones. Perhaps that accountd for the long, high neck that enabled the animal to see about. The skin was a dull, grayish brown, but I could see no signs of scales. The eyes were small. I could barely make them out and hardly well enough to describe them. The tail sometimes dragged and moved sideways slowly and deliberately.

"I remembered the pictures I had seen of reconstructed dinosaurs. This was one of them surely, though it was not quite as large as the pictures in my mind made it. This animal could have been no more than 30 feet in over all length, whereas skeletons I had observed in museums were 40 to 60 feet long.

"Slowly my 20th Century dinosaur moved away until I could see only the head and upper part of the long neck. Finally, the morning clouds settled down and soon a faint mist began to fall."

• • •

This is Mr D'Orsay's eye witness account which is twenty years old and, to date, I have not heard any other reports of him or his monster.

For many years the reports of the Komodo lizards was scoffed at as being untrue and the figment of someone's imagination. Biologists and other men of science held that if such creatures existed — reptiles of over 300 pounds, which could kill a deer or a man—we would have known about them.

Yet, as so often happens, the Komodo lizard story turned out to be true and was verified by scientific authority a few years after the rumor had been denied. Komodo Island is there and so are the huge lizards.

What of such weird mysteries as a man-eating tree, giant spiders and a huge bird supposed to exist in Madagascar? ~~What of the hangman vines~~ and butterflies of death reported from the fastness of Costa Rica? Truth or falsehood? What of giant Anaconda snakes, 50 feet in length? Can this be true?

What do you think?

Too Soon

Graveyard of the elephants,
Cleopatra's Tomb,
Lost cities of the Amazon,
black butterflies of doom.
The coelocanth fish of evolution, the first flight to the moon,
Do dinosaurs still trod the earth deep in Angola's gloom?
Thoughts like this do fill my mind, one lifetime is too soon.

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SOME ODD STORIES.

INTERESTING TALES OF ADVENTURE ON SEA AND LAND.

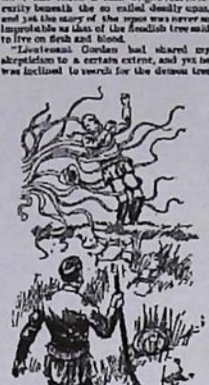
The Search For the Man Eating Tree of Ceylon and Its Fatal Termination—The Deadly Valley and Its Mystery—An English Army Officer's Story.

[Copyright, 1893, by American Press Association.]

"It was something more than the love of sport and adventure that took me back to Ceylon for a second visit," said Major Carter of her majesty's service. "I had resolved to solve the mystery of Lieutenant Gordan's most unaccountable disappearance on that wild island five years before. Gordan was a fine fellow, young, daring and enthusiastic, with a promising future before him, and the uncertainty of his fate preyed upon my mind.

"I had often heard weird stories of the man killing tree of Ceylon, but I did not believe there was the least foundation for them. To my mind the story was a myth, for I had found a man might rest in security beneath the so called deadly upas, and yet the story of the upas was never so improbable as that of the fiendish tree said to live on flesh and blood.

"Lieutenant Gordan had shared my skepticism to a certain extent, and yet he was inclined to search for the demon tree in dark depths of the wildest jungles. He had a daring and dangerous way of rambling far into the forests, his only companions being a native guide and his dark skinned servant. More than once I told him he would provide a square meal for a tiger or some other wild animal, but he only laughed at my fears.



IN THE DEADLY MESHES.

"One night he did not return. The guide and the servant came back, both frightened nearly to death, and they told a story that aroused our party to a high pitch of excitement. They declared Lieutenant Gordan had fallen a victim to the man eating tree, saying it was near midafternoon when they came to the mouth of a deep and dark valley, into which the venturesome young man insisted on penetrating. At the mouth of the valley the natives found a small stone idol, before which were scattered human skulls and bones. This served to warn them against entering the forbidding place, and they refused to accompany the lieutenant.

"Gordan was not daunted, and he bade them await his return, after which he boldly went down into the gloom of the place, leaving the natives mumbling and prostrating themselves before the idol.

"In about 20 minutes the guide and the servant heard a terrible shriek of fear and agony that came up from the mysterious and dismal valley. The cry was that of a human being in the greatest agony, and so frightened were the natives that they instantly took to their heels and fled from the spot.

"We rebuked them for their cowardice, and all of us believed Gordan had been attacked by a wild animal or a serpent. We even entertained hope that he might put in an appearance, but the night passed and morning came without any sign of him. Then nearly the entire party set out to find the dismal valley and solve the mystery of our comrade's fate.

"The guide was very reluctant about leading us, but we forced him to do so. For hours we tramped about in the jungle without finding the valley, and the guide finally declared he did not know how to lead us to it. This made us very angry, and we nearly scared the fellow to death, asserting we would flay him alive if he did not take us to the place. He started on again, and we followed, but night found us unrewarded for our pains. In returning to the camp, both the guide and Gordan's servant slipped away and disappeared in the forest, and neither was seen afterward.

"This mysterious affair threw a damper on our spirits, and the hunt was far from a success. The most of the party were inclined to believe the lieutenant had been murdered by the two natives, and I thought it not improbable.

"During the five years that elapsed before I again visited Ceylon, I often thought of Jack Gordan and longed to know the truth concerning his fate. When I found myself once more in the vicinity of our former adventures, I resolved to search for the fatal valley. Captain Starbuck, a loyal friend and a man with plenty of courage, agreed to accompany me, poor fellow! I was glad to have a white man as a companion, although I protested against taking him from his elephant shooting, but he professed some faith in the story of the man eating tree and expressed a desire to look upon the monster of the vegetable kingdom.

"Taking our servants along, we made a party of four, although we knew we could not depend on the blackskins in case of emergency. It was near midday of our first and final search that we came to the mouth of a valley that seemed to me like the one described by the native guide and Gordan's servant. All at once both our dusky aids flung themselves face downward on the ground and began chanting something in the most doleful tones, and then we saw they were bowed before a hideous stone image, around which were scattered bones and human skulls.

"'We have found the fatal valley!' I cried.

"It was useless to attempt to persuade the blackskins to accompany us into the gloom of the place, and they entreated us not to go there, saying we would never come forth if we ventured. Telling them to await our return and looking to make sure our weapons were ready for instant use, we entered the valley.

"A deep gloom hung over the place, which was disturbed by no sound save our footfalls, [illegible] not seem to make an echo. As we moved slowly onward a feeling of horror gradually and surely crept over me, although I tried to throw it off. It seemed that there was something uncanny about the valley—something weird and deadly. I looked at the captain and saw his face was pale, although his jaws were set and determination was written on his features.

"In vain we looked about for sign of living creature in that dismal vale. No bird nor animal greeted our vision; not even a snake squirmed across our path. For all of the gloom, the vegetation was luxuriant and rank, but the air seemed laden with perfumes that were sweet to the point of nauseation.

"In a short time we came to a wall of barren stone. A cry broke from my lips, and stooping I picked up a rusty rifle that lay at the foot of the wall. After a minute examination I asserted:

"'This was Lieutenant Gordan's gun. His initials are carved on the stock.'

"My voice sounded hollow and strange. I looked up at the rugged wall and made a motion to ascend. Captain Starbuck nodded, and we were soon climbing side by side.

"As we mounted upward a singular sound came to our ears. It was a sort of swishing or hissing, like the sound of a strong wind in rank reeds, and yet unlike it. This grew more distinct as we neared the top of the wall, and there was something blood chilling in the sound.

"The top was soon reached, and we looked over into a circular basin, in the very center of which rose a tree that was of a vividly green hue from its roots to its highest point. And such a tree! There were no leaves upon it, and its bare branches were round and supple, like so many serpents. From its body to its upper limit the tree was in motion. The slender limbs were whipping and cutting through the air like things of life, making the hissing sound we heard.

"A cry of amazement broke from Starbuck's lips. In an instant the tree was still, and every branch pointed straight at us. At that moment I lost my footing and slipped back a bit, falling below the level of the wall's highest point. I felt something knock my hat from my head, and then I heard a terrible shriek from my companion. My horrified eyes beheld a hundred twining, twisting things encircle him and snatch him from view in a twinkling. For a moment others played and squirmed over the wall as if feeling for me, and then they vanished.

"A short time I clung there, paralyzed with such horror as never possessed me before, and then I drew myself up to the top of the wall again. I can never forget the horrible sight that greeted my eyes. Captain Starbuck was in the grasp of that demon tree, the limbs of which were twined about him like serpents. Some had twisted themselves about his neck, and I saw he was already dead, having been strangled. And over the body the snaky arms of the accursed tree fought and squirmed.

"Sick and fainting with terror, I slid down to the foot of the wall and ran from that infernal spot as fast as my legs could carry me. I did not stop when I reached the mouth of the deadly valley, and the two natives, reading the truth on my face, kept me company.

"When I told the story at camp, it was received with mingled doubt and credulity. Some of the men could not bring themselves to believe such a thing possible, while others, knowing me better, did not doubt my word.

"We spent three days searching for that valley, and, singular as it may seem, it could not be found again. I do not know that it has been found to this day. But were I able to go direct to it," concluded Major Carter, "the wealth of England would not tempt me into its horrid confines!"

A Shark's Mistake.

We had on board the brig Emma Lane a full blooded native of the South Sea islands whom we called Kailua, which is the name of the place where he belonged. Kailua was on his way back home after a visit to civilization, and he was very happy. He was a supple, sinewy fellow, with a restless eye and a hand that could move with the swiftness of a flash. He had picked up a certain amount of broken English, and he was very proud of his accomplishment.

For some days a huge shark had been following us, and the superstitious sailors declared it was an omen of evil. They reiterated time after time that some calamity was bound to befall us. Finally we were becalmed beneath a brazen sky and in the midst of a vast, glassy ocean. Still the shark played about us, his back fin cutting the surface of the water here and there.

"It's a sure sign of death," soberly declared one old tar.

Kailua heard the words and nodded.

"Somebody got go," he said. "Kailua go."

We did not fathom the meaning of his words until he had swiftly stripped off his clothes and plunged over the rail headlong into the sea. Everybody rushed to the side and yelled at him to come back, for he was swimming swiftly from the brig, something gripped in his teeth. He paid not the least attention to our cries.

It was not long before the man eater sighted the swimmer, and we saw the sharp fin cutting through the water like a streak. A feeling of unutterable horror seized every one of us, and we watched for the consummation of the tragedy.

The South Sea islanders are the most expert swimmers, but all at once Kailua seemed to become confused or frightened, for he began to splash and flounder about in the most awkward manner. The shark must have felt sure of his feast.

Just as we expected to see the man eater grasp his prey, Kailua disappeared like a flash. It was impossible to tell how he did it, but he seemed to dive down into the water as if he had plunged headlong from a great height.

There was a sudden flurry beneath the surface, to which rose a bright crimson stain, and then up came a dark body that turned over on its side and lay still.

It was the shark, and he was dead as he could be.

But where was Kailua? We looked about for the native in vain, and all began to think he had been killed and the body had sunk to rise no more. Just as we arrived at this conclusion a hail came from under the bow of the brig, and there was Kailua, having swum under water from the scene of the encounter to the Emma Lane.

A rope was immediately flung to him, and he came aboard hand over hand with the agility of a monkey, a knife gripped in his teeth. Quickly he stood grinning before us, his black body shining in the sunlight.

"Shark sign of dead," he observed. "Yes—but! Him dead. That make right. Kailua fool him."

GILBERT PATTEN.

The chief distinction between the appearance of the male and the female Japanese lies in the hair. The men shave nearly the whole of the head, while the women allow their hair to grow, and even add to it by art when required.

A Curious Optical Phenomenon.

A [illegible] Christiania gives an account of a very curious phenomenon witnessed from the top of Gausta mountain (height 6,000 Norwegian feet) in Telemarken, south of Norway. "We were a party of two ladies and three gentlemen on the summit of this mountain on Aug. 1. On the morning of that day the sky was passably clear; at noon there was a thick fog. Between 6 and 7 o'clock in the afternoon (the wind being south to southwest) the fog suddenly cleared in places so that we could see the surrounding country in sunshine through the rifts.

We mounted to the flagstaff in order to obtain a better view of the scenery, and there we at once observed in the fog, in an easterly direction, a double rainbow forming a complete circle and seeming to be 20 feet to 30 feet distant from us. In the middle of this we all appeared as black, clear and nearly life size silhouettes. The outlines of the silhouettes were so sharp that we could easily recognize the figures of each other and every movement was reproduced. The head of each individual appeared to occupy the center of the circle, and each of us seemed to be standing on the inner periphery of the rainbow. We estimated the inner radius of the circle to be six feet.

This phenomenon lasted several minutes, disappearing with the fog bank to be reproduced in new fog three or four times, but each time more indistinctly. The sunshine during the phenomenon seemed to us to be unusually bright. Mr. Kielland-Torkildsen, president of the Telemarken Tourist club, writes to me that the builder of the hut on the top of Gausta has twice seen spectacles of this kind, but in each case it was only the outline of the mountain that was reflected on the fog. He had never seen his own image, and he does not mention circular or other rainbows."

Strange Human Antipathies.

Amatus Lusitanus relates the case of a monk who would faint on seeing a rose, and who never quitted his cell at the monastery while that flower was blooming.

Orfila tells how Vincent, the great painter, would swoon upon going into a room in which roses were blooming, even though he did not see them. Valtain tells of an army officer who was frequently thrown into violent convulsions by coming in contact with the little flower known as the pink.

Orfila, our authority on the case of Vincent, the painter above related, also tells of the case of a lady 46 years of age, hale and hearty, who, if present when linseed was being boiled for any purpose, would be seized with violent fits of coughing, swelling of the face and partial loss of reason for the ensuing 24 hours. Writing of these peculiar antipathies and aversions, Montaigne remarks that he has known men of undoubted courage who would much rather face a shower of cannon balls than to look at an apple! In Zimmerman's writings there is an account of a lady who could not bear to touch either silk or satin, and who would almost faint if by accident she should happen to touch the velvety skin of a peach.

Doyle records the case of a man who would faint upon hearing the "swish" of a broom across the floor, and of another with a natural abhorrence for honey.

Hippocrates of old tells of one Nicanor who would always swoon on hearing the sound of a flute.

Bacon, the great Englishman, could not bear to see a lunar eclipse and always completely collapsed upon such occasions, and Vaugheim, the great German sportsman, who had killed hundreds of wild boars, would faint if he but got a glimpse of a roasted pig.

The Pepper Pot.

Some years ago an Englishman who had been a resident of Guiana returned to Southampton. Scarcely had he got well inside the portals of his hotel than he incontinently asked for pepper pot. He had learned to love the dish during his eutland exile. His requests were in vain, not only in Southampton, but in London, and his importunity astonished the waiters as much as that of young Twist surprised the famous Bumble. "Then," said he at last in despair, "I will go back," and he returned to Demerara by the next Royal Mail boat.

It is further related of a respected old colonist, a native of Britain north of the Tweed, that he was able, through the intelligent devotion of his cook, to maintain a pepper pot for years. A new cook arose, unhappily, who scarcely grasped the extent of his master's partiality for this peculiar and perennial dish. He stole the floating ingredients and destroyed the pepper pot. As a result, the hardy Scot nearly succumbed to an apoplectic attack. When he was sufficiently recovered, he had no mercy on his faithless servant, who had committed a sin locally unpardonable. These anecdotes, which hail from the home of the pepper pot, serve to show that it is held in no common esteem.—Gentleman's Magazine.

A Cyclone Story.

One of the most peculiar results of a cyclone can be seen in east Jacksonville. A large oak tree was twisted by the force of the wind half way round, yet remained upright, and there are no splits or cracks visible upon its surface. This in itself would not be so peculiar were it not for the fact that the tree still lives in its new position, and the limbs which were previously on the west side are now on the east. The body of the tree is probably split, so that it will eventually die, but the bark seems to have remained unbroken and intact, and herein lies the peculiarity.—Florida Times-Union.

Piling Up the Agony.

A convict in a Californian prison had been extremely refractory. One morning the warden said to the keeper: "I say, Hiles, the scoundrel is acting worse than ever. Put him on bread and water." "But he is already doing two fast days." "Then give him a cookbook to read."—San Francisco Argonaut.

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Newark, Ohio 10-4-1893

Found It Impossible to Locate Man-Eating Tree

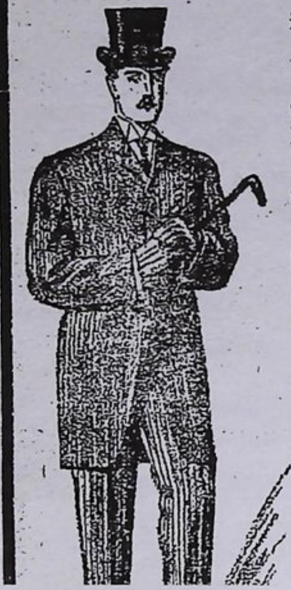
There are undoubtedly plants which entrap and devour insects, and one from India which lures mice by an odor and traps and consumes the rodent, but no one has been able to prove the existence of the "man-eating tree of Madagascar." This story was started about half a century ago by a traveler who wrote a letter to a friend in Europe of having witnessed a sacrificial ceremony where a woman was made a martyr, forced to meet death in the embrace of one of these trees. The story traveled around the world and persisted to such an extent that many travelers and scientists who have visited the country since have made efforts to verify the story. Dr. Ralph Linton of the Field anthropological expedition spent two years in Madagascar and tried to locate a man-eating tree. He encountered several persons who believed that such a thing existed, but the tree was always in some other part of the country, and he arrived at the conclusion that the story was a myth.

Monessen Daily Independent
Monessen, PA
1-23-1931

lincoln evening news - lincoln nebraska 0-8-26-1903

The East Show Window Presents a Pleasing Study in Black.

A Study in Black!



This is a "How" advertisement. When you understand its import you will greet it with a cordial "How do you do."

The announcement concerns black dress goods for men.

The materials are the crowning products of the looms. In these patterns are Black Thibets, Black Undressed Worsteds, Black Clay Weaves and Black Granite Cloths.

In styles there is simply nothing left to be desired. All are the freshest creations—the latest Fall and Winter, 1903, output. Among the styles will be observed in sacks: The new regulation single-breasted, the Varsity (copyrighted), the English 3-button, the Military and the regulation cut. Also the 3 and 4-button double-breasted Varsity. In the Cutaway Frocks, all the new lengths. In the Prince Alberts, all the newest designs.

We said this was a "How" advertisement. We mean it. It tells you how to dress correctly and just as good as the exclusive tailor's patrons at a saving of from $10.00 to $30.00 on the suit.

The formula is simple.

Out of this stock select the style that becomes you best. Try it on. If it fits you here it will fit you at home. And if it don't fit you don't take it. There's an advantage over the made-to-order. There's no paying for something just because you ordered

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on board as soon as the Daniel party reaches Sydney.

Following out the plan of d'Albertis, who penetrated farther into the interior than any other explorer in a steam launch on the Fly river. Major Daniels has provided himself with a similar vessel, though of a more modern make. Romilly, in his work on New Guinea, says that the explorers can only hope to penetrate into the interior by following some large water course, as the mountains which come down almost to the coast on every side of the island are practically impassable.

In 1878, a gold prospecting party, headed by Andrew Goldie, landed on the eastern spur of the island and attempted to scale the first mountain range. They found the jungle so thick that they were forced to cut their way through with axes. They made less than two miles a day and were finally stricken with fever and were forced to turn back before they reached the summit of the first range. It is known, however, that beyond this range there is another of high peaks and wild solitudes, but what lies betwen the two ranges or what lies beyond the second one, no one has ever been able to even surmise.

D'Albertis says that in a country of such mountainous aspect there is almost certain to be great mineral wealth. The climate and the scarcity of good water in the known portions of the island render it an unsuitable place for white colonization. In portions of the island explored by d'Albertis the water was so bad that the party was forced to rely on cocoa milk for their only drink.

Major Daniels goes prepared for all these emergencies. He has done other exploring of wild lands in his short lifetime and in his early youth. When he was a mere boy, he spent a number of years in the islands of the South sea. He visited New Zealand, Somoa, and some of the larger islands in the Polynesian group. He lived for months in Australia and became thoroughly informed on climatic and pathological conditions of the whole western Pacific.

He is no novice in the opening up of

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his camera. These pictures substantiated his report that something huge had caused a disturbance on the lake.

Six months later a group of London sportsmen on a duck shooting trip watched in astonishment as a great snaky head on a knobby neck rose from the water and gazed intently at them. A member of the party got two pictures, shaky but proof that they had seen something very strange indeed.

Crocodiles or Whales

When the reports of the Loch Ness monster reached the newspapers there were the usual swarm of self-appointed "experts" who claimed they could explain everything. They offered a wide variety of suppositions, varying from crocodiles to schools of fish and even a white whale.

Sir Edward Mountain, an English nobleman hired watchers to make records and films of fairly regular appearances of the "thing."

In October 1954, a driver stopped his bus so that his passengers could watch it playing around on the surface of the lake in a shallow cove. It was a dirty grey long-necked brute, just as Hugh Grey had described it 22 years before.

In December 1954, the fishing trawler Rival was crossing the lake when the electronic echo sounder began charting an unusual object beneath the boat. About 540 feet down something was swimming.

Radar had drawn a picture of an "object" that lives in Loch Ness.

Certainly there's something there. But whether it is a monster has still yet to be proved.

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strange to relate
by FRANK EDWARDS

seen this tree in action was in 1878. **Carl Liche**, an explorer, *was determined to* see the phenomenon and was eventually taken in secret to see the tree by members of the Mkodos tribe to whom he had rendered a service.

The dance

According to his description the tree was eight feet high. It was shaped like a pineapple; dark brown in colour and had no branches.

At the top of the trunk was a cup-like depression, resting on what looked like a huge saucer. From underneath this saucer grew eight gigantic leaves. According to Liche, these were sword-shaped, two feet thick in the middle and at least twelve feet long with four feet of the tips resting on the ground. All over their surface were sharp, thorny protuberances. From the underside of the saucer hung hundreds of tendrils — each about seven feet long.

Liche was allowed to see the ceremonial Dance of the Tree during which the natives, accompanied by monotonous beating of drums, worked themselves to a frenzy.

At the peak of this they surrounded a naked woman and forced her, at spear-point, to dance to the foot of the tree. Then she was forced to climb up the trunk and stand on the depression at the top.

At that moment, according to Liche's story, the tendrils came to life and twisted and whirled around the woman, who looked as if she was in a trance.

At once the dancers started screaming "Taik!" "Taik!" meaning "Drink!" "Drink!"

The woman bent down and drew some fluid from the depression and drank it. The tendrils wrapped themselves around her until she was completely encased.

Then the eight huge laves rose in the air and closed over the woman. Slowly the edges met and pressed inward until the victim was lost to sight. **For ten days the leaves remained in that position. On the eleventh day they reverted to**

Hermann Waldhausser, 47, had suffered headaches and lack of sleep for twenty years before he married Christiane Reitz, 38, two months ago. "The trouble was that he was sleeping in a bright yellow room with gold-coloured blankets," said the bride, who is also an interior decorator. "I changed the colours to soothing blue, and he was healed within two weeks. Now I am adding warmer colours because he sleeps too much."

• • •

WERVICO, France: MRS. VALENDUX LORIDANT was awarded the Order of Merit on the same day as her husband. Between them, the happily-married pair have totalled 125 years of work at the Dalle factory here. "I am sorry for women who do not work with their husbands," said the Frenchwoman. "They are separated from the man they love for almost half their waking lives." —WNS.

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ELKE SOMMER, lounging lazily dot her Hollywood home.

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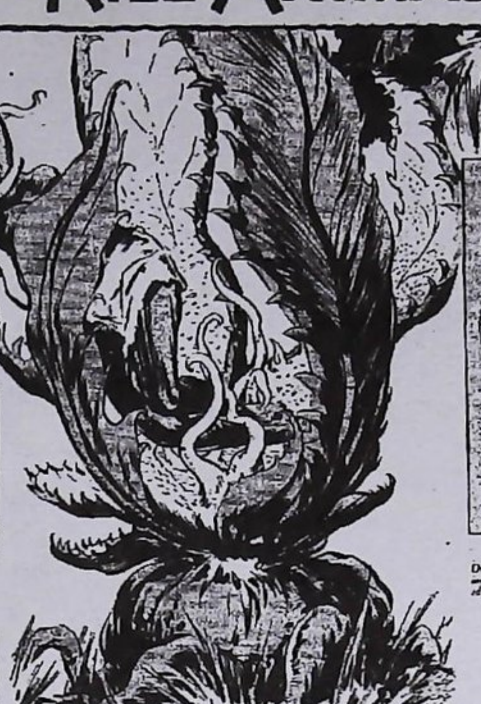
PLANTS that KILL ANIMALS

and DEVOUR their FLESH



The famous man-eating tree of Madagascar . . . which, you may be relieved to know, never really existed.

Don't believe the tale about the man-eating tree of Madagascar, but here's one that's true

By Dr. Frank Thone

WHEN an animal bites a plant, that is hardly news. Animals are doing that all the time: cows and caterpillars, mice and men; they'd die very soon if they didn't.

But when a plant bites an animal there may be an interesting story in it. There are, indeed, a great many interesting stories that might be told of plants that eat animals, in spite of the fact that there are not many such plants, and that the most widespread and sensational of such stories aren't so.

The tales about the man-eating tree of Madagascar are about the most completely hardy perennial species in all popular pseudo-scientific literature, and also about the most completely exposed. They go with the similar yarns about the deadly Upas tree of the East Indies—the tree that was said to knock down men and animals with its mere poisonous breath.

Both the Madagascar monster and the poison-scented Upas must go the way of all myth. There are no trees that destroy men, but there are, all over the world, many smaller plants that regularly make meals of insects and other small animals' forms.

Some of these carnivorous vegetables live in the tropics, or in those strange reverse lands "down under," Australia and South Africa. But there are many of them in America. Some of them live in the water, and the rest, without exception, live in bogs.

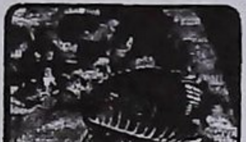
THAT is the secret of the strange bloodthirsty habits of these plants—bog water. Bog water is acid, and for some reason not yet well understood acid water prevents roots from getting the nitrogen which all plants must have.

One of the principal constituents of animal flesh is this same nitrogen. It is primarily to get it that we ourselves eat meat and eggs and cheese, and it is to get nitrogen that some of the nitrogen-starved plants of bogs and acid ponds have developed their weird, uncanny ability to capture and digest insects and other creeping and swimming things.

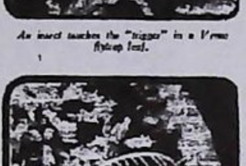
Botanists have known about the flesh-eating habits of some plants only within comparatively recent times. Some of the plants they knew, but did not realize what their strange behavior really meant.

Erasmus Darwin, for example, the clergyman-naturalist who was grandfather of the great prophet of evolution, wrote in 1790 that the sticky tentacles of the sundew were of use to the plant by preventing insects from eating the leaves, and that the hollow leaves of the pitcher-plants were simply water containers. He apparently had no suspicion of their true nature.

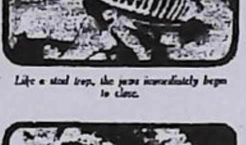
However, his famous grandson amply redeemed the family reputation in this respect, for one of his best books is on "Insectivorous Plants." In this work everything known at the time about plants that eat animals was summed up in a most masterly fashion.



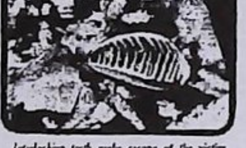
An insect touches the "trigger" in a Venus flytrap leaf.



Like a steel trap, the jaws immediately begin to close.



Interlocking teeth make escape of the victim impossible.



Completely shut, the plant now digests its prey.

SINCE Darwin's day, of course, many other students have given their plants their attention. The latest effort has been on the part of Prof. F. E. Lloyd of McGill University in Montreal, who recently summed up all the modern advances in our knowledge of carnivorous plants before the Royal Society of Canada, and illustrated his remarks with motion pictures of his own taking.

These pictures are among the most remarkable of nature films ever made. We have grown used to jungle pictures of fights between tigers and water buffalo, cobras and mongooses, and so on. But never before have men been privileged to see movies of the deadly work that goes on in the little jungles underfoot, where plants kill animals and devour their flesh.

In his survey of the world for plants that eat animals, Professor Lloyd found some 440 species, belonging to 16 genera and grouped into five plant families. This is really an exceedingly small array, considering the hundreds of thousands of plant species known, and the probably large number of species still undiscovered.

It may perhaps be taken as an indication of how hard it was for plants to learn the trick of getting their food by killing.

PROFESSOR LLOYD classifies all carnivorous plants into two main groups, passive traps and active traps.

The passive traps catch their prey either by secreting sticky substances that act like fly paper or by arranging pits into which the insects tumble and cannot get out again.

There are three types of active traps: plants that add aggressive movement to the fly paper arrangement of the first type of passive traps, plants that snap shut on their prey like steel traps, and plants that cage their prey.

Of the first of these five kinds of insect traps there are no examples easily reached in America; and they are in any case the least interesting of the insect traps.

The second type, however, the pitfall trap, is exceedingly common in some parts of the United States and Canada; and it is, moreover, the largest and most conspicuous of all the carnivorous plants.

Plants belonging to this class are mostly to be found in the various genera of pitcher-plants. Pitcher-plants grow abundantly in bogs wherever they occur in Canada, southward through the Great Lakes region and on down into Kentucky and Florida.

THE most striking thing about them, even to the casual observer, is the structure of their leaves. These are hollowed into graceful vase-shaped "pitchers," with a projecting flap down one side to take the place of the handle.

On the upstanding "lip" of the pitcher, and again around a zone within, there are multitudes of down-pointing bristles, against which no insect could possibly climb. Below that is an area without bristles, but too smooth for frantic insect feet to clutch. Below this again is another bristle-set zone.

To make the trap the more attractive, near the rim are many glands that secrete nectar, like that of a flower, a stuff of which insects are notoriously fond.

More sinister is the purpose of other glands, found abundantly farther down the pitcher.

Photo by Cornelia Clarke

One of the trumpets of the pitcher plant, showing an insect, attracted by the nectar near the edge of the pitcher, making his fatal misstep into the pit.

THEY secrete a ferment or enzyme which digests flesh just as the pepsin of our own stomachs does.

Even more widespread than the pitcher-plants are the sundews. These plants grow on wet soil almost all over the world, wherever the chemical reaction is acid enough.

Most of them are quite tiny plants, seldom more than a couple of inches across the whole rosette of their tiny leaves, or more than that high to the top of their little spire of flowers.

Their leaves are either round or paddle-shaped, and each leaf has a fringe of projecting little fingers around its edge, and similar fingers all over its surface. Each of these tiny fingers ends in a gland that secretes a sticky stuff that holds any gnat or other tiny insect that touches it as tanglefoot fly paper holds a fly.

But the action of the sundew trap is not the merely passive action of fly paper. When one or more of its sticky-tipped fingers catches an insect, the insect naturally struggles. Then other fingers in the neighborhood, stimulated by the movement, slowly bend in its direction, and each sets its sticky tip on the luckless victim, pinning him yet more firmly.

PERHAPS most famous of all the carnivorous plants is the Venus' flytrap, which is found only in a limited area of the coastal plain of the Carolinas, principally around the city of Wilmington, N. C.

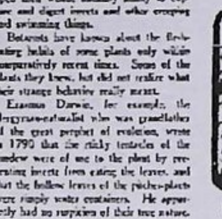
The leaves of this plant are perfect counterparts of the steel traps used by fur trappers of the north. Each is divided at its outer end into a pair of semicircular, bristle-edged flaps that hinge along the midrib and can close together in as little time as half a second.

Each of these flaps has three bristles on its surface, which are the triggers of the trap.

When an insect alights on a leaf, or a caterpillar crawls up along the stem, it cannot avoid touching these trigger bristles. When it touches the first one, nothing happens. But a second or so later it touches another.

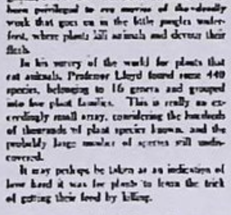
The two stimuli, following one on the other within a stated time, trip the internal mechanism, whatever it may be, and the two halves fly together. The bristles on the outer edges interlock like the teeth of an alligator, so that there is no chance for even a small insect to crawl out.

And then the two halves of the leaf, at first concave with a little space between them, press together tightly, and the digestive glands pour out their corroding juices.

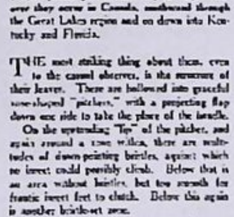


The tendril traps an insect

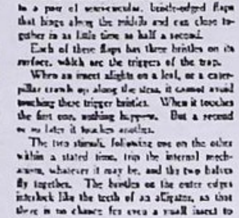
Up comes the end of the leaf—



The sticky tendrils curl over it.



—bending down on the captive—



—and the capture is complete.

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the per capita insurance is $650.

Q. Several days ago I read in a paper that in central Africa there grows a tree that draws and crushes anyone accidentally touching it. Can you tell me anything of this? A. E. G.

A. It is possible that you have reference to the man-eating tree of Madagascar, which is described by Chase Osborne, former governor of Michigan, in his book on Madagascar. Altho he states that he has never seen this tree, the natives believe in its existence and other travelers claim to have seen it. This tree is somewhat similar to a pineapple, of enormous size, and contains an amber liquid which when drunk affects the brain of the individual. The natives are accustomed to sacrifice individuals to the tree.

Davenport Democrat and leader

Davenport, Iowa

2.21.1927

"ALABAMA'S LARGEST WEEK

Found It Impossible to Locate Man-Eating Tree

There are undoubtedly plants which entrap and devour insects, and one from India which lures mice by an odor and traps and consumes the rodent, but no one has been able to prove the existence of the "man-eating tree of Madagascar." This story was started about half a century ago by a traveler who wrote a letter to a friend in Europe of having witnessed a sacrificial ceremony where a woman was made a martyr, forced to meet death in the embrace of one of these trees The story traveled around the world and persisted to such an extent that many travelers and scientists who have visited the country since have made efforts to verify the story. Dr. Ralph Linton of the Field anthropological expedition spent two years in Madagascar and tried to locate a man-eating tree. He encountered several persons who believed that such a thing existed, but the tree was always in some other part of the country, and he arrived at the conclusion that the story was a myth.

cullman democrat - cullman alabama - 3-19-1931

A STRANGE STORY.

The Man-Eating Tree of Central America.

IT CAPTURES AND KILLS MEN

And Animals—An Interesting Story of an Adventure with a Remarkable Vegetable.

From The St. Louis Globe-Democrat.

The next day Carlinos and I had decided upon a hunt in the mountains that made a jagged outline against the sky off to the south. While we were getting guns and cartridges into condition for use Ferrara approached and said in his smoothest tones:

"If the senors went to the valley, down beyond the Contadino pass, they would find where a great panther roams and has been seen many times. I myself saw it but two days ago, but I was unarmed, so I put spurs to my horse and galloped away."

Carlinos turned to me with a look of interest. "That's a good idea," he said. "We'll look for this panther first, and if we fail to find him we can try the mountains."

We were about to turn away when Ferrara stopped us, with many apologies. "Beyond the Contadino pass," he said, "you will find a narrow trail leading off eastward down the valley. Follow that trail a half mile, until you see a huge white cliff a hundred yards to the right. At the foot of that cliff the panther has been seen again and again. Adios, senors!"

And so Carlinos and I went walking off, with swinging stride toward the pass, glad of a day in the woods, and ready for any adventure that came along.

Except the one that actually did come. For within the next hour we passed through the most terrible experience that ever fell to the lot of mortals, I am sure.

We found the pass—a mere gap in the mountains, not used for travel, as another pass, a few miles farther south furnished the nearest road to the town. The pass was strewn with rough boulders and jagged masses of rock, difficult to make one's way over, and for half an hour we had all the exercise we needed in climbing over and around these obstructions.

At last, however, we were clear of them, and we shouldered our guns again after a brief rest, and went on until we found the trail among the bushes. It was such a path as would be made by cows or sheep going to and from a watering place, and I was going along paying very little attention to it, when Carlinos, who was in the lead, suddenly stopped and muttered, "That is strange!"

I looked over his shoulder and there, in the yellow sand was the barefoot track of a man. We easily traced it along down the trail for several hundred yards, and then it suddenly disappeared as though the owner of the track had turned off into the thick undergrowth. We both followed it up to that point, and then, missing it, looked at one another and said again, "That is very strange."

And then we both laughed, and Carlinos said: "But it might have been some herdsman looking for a stray cow or sheep."

But I noticed that Carlinos looked after his cartridges a little more closely, and held his gun in a position to use it, if necessary. And just then the cliff that Ferrara had described came into view, about 100 yards away, and we turned off from the path toward this place, in which the panther had been so often seen.

Scarcely had we started in that direction when we were startled by the long, fierce scream of the panther itself. As nearly as we could judge it was at that very moment at the base of the cliff. We stopped involuntarily at the sound and then went stealing down the slope, with eyes watchful and nerves stretched to the utmost. Yet we went on and on, without seeing it, and suddenly found ourselves at the base of the cliff, which had been hidden by the thick and tangled brush through which we had passed.

Then we stopped and looked around, peering here and there through the bushes. It was easy to see that the spot of ground on which we stood had been the haunt of some wild animal, for all about us bones lay bleaching on the ground. But nothing was to be seen. The face of the cliff, up to a height of twelve to fifteen feet, was covered with the matted tendrils of a dead vine, apparently. It suddenly appeared to me that the panther's den might be back under the cliff, hidden by the vine, and I was about to investigate when behind us, not ten feet away, sounded the horrible scream of the panther.

Both of us whirled and Carlinos stepped back a little. In the moment of confusion I failed to notice him, but in an instant he gave a heart-rending cry: "Help! help! quick, the tree! The man-eating tree!"

Never will I forget that cry, nor the sight that met my eyes. In stepping back he had stumbled against the dead vine, as I had thought it. And then in a moment every tendril had become instinct with life, and was twisting and writhing about him with the most horribly snake-like motions, knotted around his body and legs, binding his arms tight and drawn across his face and clasped about his throat.

Already when I looked around he was helpless. During the single moment while I stood there looking at him motionless with horror, his face had begun to turn purple. And then all at once I recovered myself a little, and, snatching my hunting knife from my belt, began cutting and slashing at the horrible, writhing tendrils in the effort to cut their victim loose.

But before I had made three strokes something had caught my arm and held it; then something crawled swiftly about my neck; and then there were others around my hands, over my head, across my face—everywhere at once I was seized and held, while wherever the snakey monsters touched went fierce pains, as though my flesh were being torn from my body. I felt my consciousness slipping away, but as it was going suddenly the dark face of Ferrara peeped out of the bushes in front of me, and cried with mocking laughter.

"I hope you enjoy yourselves, senors. The panther is not far away. Before me. Only wait for him until he comes. Adios! Adios!"

The shock of anger roused me a little in the midst of my racking torture, and I saw Ferrara turn to go away, but all at once, amid a chorus of maledictions, a dozen hands seized him and pinioned him down, and we were surrounded by a crowd of the laborers from the plantation. With long knives they cut and hacked at the limbs that were sucking the blood from our veins, and in a few moments they had us free. How they got us home I never knew.

It was not until the next day that I recovered consciousness, and I was unable to turn in my bed, even, for two weeks. The excoriations on my face and hands left painful wounds, which were a long time in healing, and which made dreadful scars. These have all gone, however, except the one on my neck, which resembles the scar left by a centipede.

As for Carlinos, he lay as if dead for several days, and there were times when he was pronounced really dead. Then he went off into fever and raving delirium, and it seemed that he could not possibly recover. After awhile, though, he did struggle back into life, but his health was wrecked and he was never again able to walk as much as 100 yards.

How did we happen to be rescued? Why, some of Ferrara's fellow-servants had heard his muttered imprecations against us, and when we had gone and they saw him sneak away after us, they held a consultation and decided to follow. I have always believed that Ferrara circled around us, got in ahead and imitated the cry of the panther himself to lure us on. I have never been able to find out, however. When I had regained my strength enough to feel some little curiosity, and asked one of my rescuers what they had done with Ferrara, he answered, with the utmost unconcern:

"We gave him to the man-eating tree, senor!"

GRUESOME COMPANION IN DEATH.

A Pet Black Snake Winds Itself About Suicide Eisele's Arm.

From The New York Times.

Charles Eisele, nineteen years old, committed suicide yesterday afternoon in the dingy and poorly furnished little room in the boarding house at 238 East Forty-Sixth street, and as he lay cold and still on the cot a blacksnake crawled up and wound itself about the arm above the stiffened fingers closed tightly over a revolver.

Eisele was a taxidermist. Here and there about the room where he lived were birds of gay plumage, mounted with considerable skill. There were more on the walls and under the narrow cot were several hundred of them.

Eisele did not go to work yesterday morning. In the afternoon he visited his friend, Charles Meixel, at 334 East Forty-Sixth street. He started for home at 3 o'clock, after asking Meixel to come to his room in an hour.

When Meixel called Eisele lay on the bed and at first he seemed to be only sleeping. Again and again his friend called him, but there was no answer. Eisele had been dead more than an hour.

Word was sent to the Twenty-Third precinct station and Policeman John McDermott went to Eisele's room.

He opened the door and then drew back with a shudder. The black snake, coiled about the dead boy's arm, flashed up its head and turned its vicious eyes toward the intruder while it slowly uncoiled itself.

From Meixel the policeman learned that the snake had been a pet, which Eisele had owned for some time, and of which he had been very fond. It was allowed to crawl about the room at will. Until recently an owl shared Eisele's affections with the snake.

Meixel told the policeman that the mounted birds and animals in Eisele's meager quarters were worth at least $1,000.

Eisele's father lives at 688 Tenth avenue, but the young man had not lived at home for nearly two years. In the suicide's room were found two letters addressed to his father, but neither gave a reason for his act.

It is thought that loneliness and homesickness were what caused him to end his life.

He Would be Responsible.

From The Boston Budget.

A minister of a prominent New York church, who was about to leave home for a few days, was bidding goodby to his family.

When he came to Bobby he took the little fellow in his arms and said: "Well, young man, I want you to be a good boy and take good care of mamma."

Bobby promised and the father departed, leaving him with a very large and full appreciation of his new responsibility. When night came and he was called to say his prayers the young guardian expressed himself as follows:

"O, Lord, please protect papa and Brother Dick and Sister Alice and Aunt Mary and all the little Jones boys and Bobby. But you needn't trouble about mamma, for I'm going to look after her myself."

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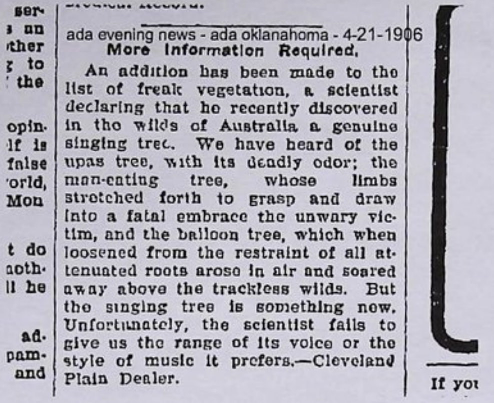

ada evening news - ada oklanahoma - 4-21-1906

More Information Required.

An addition has been made to the list of freak vegetation, a scientist declaring that he recently discovered in the wilds of Australia a genuine singing tree. We have heard of the upas tree, with its deadly odor; the man-eating tree, whose limbs stretched forth to grasp and draw into a fatal embrace the unwary victim, and the balloon tree, which when loosened from the restraint of all attenuated roots arose in air and soared away above the trackless wilds. But the singing tree is something new. Unfortunately, the scientist fails to give us the range of its voice or the style of music it prefers.—Cleveland Plain Dealer.